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Proposed Revised Code Further Considered

Various Articles Thoroughly Discussed at Long Drawn Out Meetings of the Board of Governors of the American Paper and Pulp Association and the Paper Industry Authority, Held in the Waldorf, New York, Last Thursday and Friday—Some Minor Alterations Recommended—Further Suggestions Asked From Divisional Groups

[FROM OUR REGULAR CORRESPONDENT]

The second revision of the Proposed Revised Code of Fair Competition for the Paper and Pulp Industry was considered last week at an all day session of the Board of Governors of the American Paper and Pulp Association, held at the Waldorf-Astoria Hotel, New York, Thursday last.

Paper Industry Authority Holds Long Session

Following this meeting, the proposed revised code was taken up by the Paper Industry Authority which thoroughly discussed the various provisions of the code until well after midnight Thursday and all day Friday.

While no basic changes were recommended, some minor alterations were proposed and copies of the suggested amendments will be sent out to all the manufacturers of paper and pulp towards the end of this week for their consideration.

Final Revision Anticipated Shortly

Further suggestions for the improvement of the revised code are also being requested from the various divisional associations and in due course the Board of Governors of the American Paper and Pulp Association and the Paper Industry Authority are to meet again when it is hoped the final revision of the code will be in complete shape for presentation to the National Recovery Administration in Washington, D. C.

Tissue Men Discuss Problems

One of the most important group meetings which took place during the past week was that of the Association of Manufacturers and Converters of Tissue which was held at the Waldorf-Astoria Hotel last Tuesday.

There was a spirited discussion of the problem of establishing a more equitable balance between machine production and consumption of tissue and tissue products.

M. H. Lund, secretary of the association, was instructed to send a questionnaire to all tissue mills with the object of discovering how many tissue manufacturers were in favor of restricting the number of hours of machine operation to 120 hours in any one week.

Many Group Meetings Held

Other group meetings were also held during the past week at which the new code was considered and the general opinion seemed to be that the second revision of the Proposed Revised Code of Fair Competition for the Paper and Pulp Industry provided a set of rules which would greatly assist the industry in working out its various problems for the benefit of all concerned.

Paper Makers' Felt Code Approved

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., May 16—Announcement has been made by the National Recovery Administration of the approval by Administrator Hugh S. Johnson of the code of fair competition for the paper makers' felt industry. It will become effective May 21. Approval was given with the provision that the prescribed waiting period between the filing and effective dates of revised price lists or revised terms and conditions of sale would be stayed pending a further order.

The code establishes a 40-hour week with certain exceptions. The limitation on hours does not apply to managerial and supervisory employees receiving $35 or more a week and a 10 per cent tolerance is provided for engineers, electricians, firemen, shipping and outside crews, provided that they be paid time and one third for all hours in excess of 40.

The minimum wage established is 35 cents an hour.

The industry is made up of eleven concerns which in 1933 did a business of approximately $9,000,000. In 1929 these same concerns had annual sales of approximately $15,400,000. In his report to the President the Administrator stated that there has been a relatively small decline in employment in these mills. In 1929 there were 2,294 employees and in 1933, 1,999.

J. R. Doubman on Paper Authority

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., May 16, 1934—J. Russell Doubman of Philadelphia has been appointed the NRA representative on the code authority of the wholesale paper trade by General Hugh S. Johnson, according to announcement just made. Mr. Doubman is associate professor of merchandising of the Wharton School of Finance and Commerce of the University of Pennsylvania. He will serve for six months.

Abitibi Power & Paper Co's Affairs Advance

With Six Mills Closed Down and Three Most Efficient Plants Operating, Enough New Business Has Been Secured to Reduce Obligations to Bankers Considerably—Increased Newsprint Consumption May Improve Price Situation

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., May 14, 1934.—Abitibi Power and Paper Company's annual report, which will be released shortly, along with an expected communication from the protective committee for the bondholders, will show considerable advance to have been made in dealing with the company's problems by the receiver, T. Clarkson. It is hardly expected that bond interest will be shown to have been earned in 1933, or indeed that earnings were on a sufficient scale to give hope that bonds could possibly under such conditions of volume and price resume their old standing and rate of interest, but with six mills closed down and the three most efficient mills operating, it is said that enough new business has been secured to make a considerable advance in the direction of reducing bankers' advances of $4,261,038.

Some say that the $1,500,000 secured by 100,000 common shares of Provincial Paper has been repaid and that these shares are now in the treasury of Abitibi Power and Paper Company. Whether or not this is so, it is expected that the report will contain some surprises. The Murray Bay Paper Company liabilities are expected to be cleared away as a result of property and plant sales made, and a large part of the wood supplies at Espanola and Spanish River, which it was feared might rot if left too long, are understood to have been liquidated.

The company has been released from the most onerous part of its obligations to take power from Ontario Power Service Corporation since the latter was taken over by the Ontario Government. Some disposition, sooner or later, will be made of the Spanish River and Espanola mills. The Thunder Bay mill, though operating at a loss recently, will be kept going and all obligations met with reference to it, it is understood, because it would be much against the company's interests to have the property revert and let others operate the property in a keenly competitive manner in order to get their value out of it. It is stated that if the volume of newsprint continues to increase in the way it is doing, it will have a considerable effect on prices.

Newsprint Mills in Better Condition

After four years of depression, the newsprint companies are at last in an inventory position from which they can benefit by improving conditions. There are even rumors that a shortage of pulpwood exists. However this may be, the fact remains that immense wood-piles which could not be turned into newsprint now seem to be a thing of the past. Time has largely been responsible for the betterment. The mills have gradually been able to use up their surplus inventories of wood. Other factors in the situation have been the larger demand in the States during the first quarter of the year, coupled in recent weeks with a fear on the part of purchasers that a railway strike might tie up the raw material for their newspapers.

The fear of a railway strike has in part been responsible for the increased scale of operations now maintained at many of the Canadian mills. In Manitoba, only 12,000 cords of pulpwood have been cut. At Sault Ste. Marie, only 60,000 cords have been cut. For William has only about half the pulpwood required. Iroquois Falls has sufficient pulpwood, as has also a number of the Quebec mills. International Paper might have a small shortage, but the situation there depends upon the result of the drive.

Consolidated and Port Alfred have sufficient pulpwood only for a 50 per cent scale of operations. Donnacona, Lake St. John and Rothermere's mills only have sufficient wood. Price Bros. has sufficient wood for production on a 75 per cent scale. It is understood that there is a big shortage at St. Anne's. All of which indicates that the industry should be able to look to the future with the hope of increasing profits rather than with an endeavor merely to reduce losses, for none of the mills now seem overstocked with their chief raw material.

May Reopen Pine Falls Mill

It is learned on reliable authority from Winnipeg that purchases this summer and fall of large supplies of pulpwood—between 50,000 and 70,000 cords—are being planned by the Manitoba Paper Company at Pine Falls. Estimated on the basis of previous deals, such purchases would involve an expenditure of about $400,000. The management has in mind recent improved conditions in the newsprint industry and plans to have available at the mill an ample supply of wood should conditions further improve to a point where the Pine Falls plant would be again placed in operation. When running to capacity, the Pine Falls plant uses close to 100,000 cords of pulpwood annually.

Great Lakes Employ More Men

With three working shifts scheduled for the summer months, sixty more employees will shortly be put on the payroll of the Great Lakes Paper Company, at Fort William, as the result of additional orders for newsprint, according to company officials. Newsprint production is to be stepped up to 325 tons per day and at peak operations to be attained soon, approximately 400 employees will be on the payroll.

The winter's cut of raw pulpwood has been one of the largest in years, assuring a steady supply of wood for the mill throughout the year. Inaugurating the season's shipments of paper to United States consumers the *Renvoyle* cleared last week with several hundred tons of paper for newspaper presses in Detroit. In the meantime it is intimated that reorganization proceedings for the Great Lakes Paper Company may be initiated shortly.

Compared with numerous other receiverships, bondholders appear to be in a favorable position in any negotiations that may be undertaken. Just what steps may be taken to reorganize the company will depend largely on what view the Supreme Court of Canada takes in regard to the Companies Creditors Arrangement Act, it is stated. If the statute is outlawed in the courts, sale proceedings will probably be taken under the mortgage, so that reorganization may be effected.

This would involve putting the property up for mortgage sale, and probable purchase by the bondholders' committee. In the most difficult period for the newsprint industry in twenty years the company has been able to make a profit. The reason for this is believed to be the exceptionally low costs on which the company can turn out its product.

Paper Demand Moderately Active in Boston

Fine Paper Business Rules Slow to Fairly Good—Bonds and Ledger Papers Moving in Fairly Satisfactory Volume—Some Improvement Noticed in Coarse Wrapping Paper Market—Orders for Summer Specialties Predominate

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., May 12, 1934.—The Boston paper market was fair to good during the last week. While wholesalers' reports varied, they were generally optimistic. In one case, the volume of sales was favorable, with several good-sized orders, but business was not so steady as desired by this fine paper house. At the office of a large manufacturer of fine paper, it was stated that business had been a little slower and at another that it had been pretty good. Bonds and ledgers moved in moderate volume on the whole. The demand for papers for advertising purposes was in fair proportions. The call for wrapping paper was at least fair, one dealer noting considerable improvement. At one house handling both fine and wrapping paper it was stated that the demand had continued good since the first of the year. Specialties, such as drinking cups and napkins, continued active with orders from large business concerns and for use at amusement parks.

The board market was moderately active. Dealers do not expect the speculative buying which prevailed a year ago at this time, especially on boards for folding box purposes. As manufacturers of wall boards are prevented from selling seconds for building purposes, under the Code, they are offering them in some cases, at least, in competition with chip board for textile boards. The wall board seconds are being sold at $30 a ton, compared with $52.50 a ton, the price of chip board.

Slowness in the paper stock market persisted, with a few grades declining again in price. In old papers, overissue news fell off five points to .45@.50. Under bagging, foreign gunny No. 1 declined to 1.40@1.45 from 1.55, but domestic gunny held at 1.20@1.25. New domestic rags, though weak, were unchanged in price. In old domestic rags, No. 1 roofing stock went down to .85@.90 from .95@1.00 and No. 2 roofing stock to .70@.75 from .75@.80. The No. 3 grade was sustained at .60@.65.

New England Paper Merchants Meet

The May meeting of the New England Paper Merchants Association took the form of a business session and outing at the Warwick Country Club, Warwick, R. I., last Thursday. The attendance, over 60, fell a little short of the acceptances, as those at a distance were discouraged on account of the heavy rainfall during the forenoon. Those who came were rewarded by a beautiful, sunshiny afternoon, with a stiff southeast sailing breeze, which, however, did not prevent Leroy Gardner, of the R. L. Greene Company, Providence, from doing a few aerial stunts in his plane for the benefit of the gathering between the business meeting and the luncheon.

President F. Bendel Tracy presided at the business meeting. Arthur Chamberlain, executive secretary of the Code Authority, a special guest of the meeting, gave an interesting report of the Code activities to date. C. A. Esty, Code Authority for Region No. 1, gave an address, and John H. Brewer a talk on the envelope situation. The general program, as outlined, was followed, with the afternoon devoted to golf, tennis, pitching horseshoes and other diversions.

William N. Stetson, Jr., won the prize for the net low in golf. The kickers' handicap was a draw between Arthur Chamberlain and E. L. Cummings. The Industrial Paper and Cordage Company, of Pawtucket, donated the golf prizes. An excellent dinner was followed by an entertainment by the Club Bagdad.

The committees were: Reception: Jack Halkyard, Jim Campbell, George Kerr, Lindsey Cummings, Alden Arnold. Sports: Golf, Harold Simmons, Len Dix, Lindsey Cummings; tennis, Knowlton Shaw, Al Logan; baseball, Jim Campbell and Reg Taylor.

News of the Trade

The best advertising printing of the last year was displayed in the Carter Rice Building, 250 Devonshire street, May 7 to 11, inclusive. The exhibit, representing the most outstanding examples in current design and typography, was selected and arranged by the American Institute of Graphic Arts from specimens and folders, announcements and broadsides submitted by advertisers and printers all over the country. About 50 display boards were used in displaying the specimens. An announcement was sent out by Carter, Rice & Co., Corp.

The St. Regis Paper Company, of 60 East 42nd street, New York, with several mills in New York State, is opening a New England sales office in the Chamber of Commerce Building, 80 Federal street. K. L. Moses is to be the representative. Mr. Moses was formerly the New England representative of the Groveton Paper Company.

The Atlas Paper Company, of Boston, distributor of wrapping paper, bags and twine, has located in one of the buildings on Binney street, Cambridge, Mass., formerly occupied by the American Rubber Company.

Howard T. Brown, vice-president of the Inland Paper Board Company, Norwich, Conn.; William Foulds, Jr., vice-president of Lydall & Foulds Paper Company, Inc., Manchester, Conn., and Kimberly Stuart, a vice-president of the Neenah Paper Company, Neenah, Wis., called on the trade last week.

Bids for Government Paper

WASHINGTON, D. C., May 16, 1934—The Government Printing Office has received the following bids for 2,000 pounds of No. 1 gummed kraft paper in 24 inch rolls; R. P. Andrews Paper Company, at 10.5 cents per pound; Whitaker Paper Company, 12.7 cents and 12.16 cents; Barton, Duer & Koch Paper Company, 10.5 cents; Mathers-Lamm Paper Company, 9.8 cents; Reese & Reese, Inc., 10.3 cents; Dobler & Mudge, 10.9 cents; Cauthorne Paper Company, Inc., 9.16 cents; W. L. Jones, Inc., 10.5 cents; and H. C. Davis Paper Company, 10.5 cents.

To Discontinue Deceptive Marking

WASHINGTON, D. C., May 16, 1934.—The Federal Trade Commission has entered into a stipulation with a corporation manufacturing corrugated boxes and corrugated paper which will cease stamping on its products the word "maker" in a way that would deceive purchasers into believing them to be manufactured by the jobber concern whose name is also stamped on the boxes or paper. The name of the firm, as is the usual custom, has been withheld.

Chicago Paper Market Practically Drifts Along

Demand for Various Standard Grades of Paper Less Active Than in April and Early March—Request for Book Paper Only Moderate—Cover Paper Situation Unchanged—Coarse Paper Section Steady—Kraft Specialties Moving Freely

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., May 14, 1934.—The Chicago paper market drifted along during the week, demand not so favorable as early in March and April and giving some signs of sliding into that summer quiet which the industry hoped to at least partially dodge. Market reports are undeniably spotty but, in general, based on optimistic premises. The book market reports a lessening of demand in comparison with previous weeks, while the cover market is reported as practically unchanged. Kraft continues on an even basis with the demand for specialties reported to be outweighing that for other lines. Fine papers in general made no change in their position during the six-day period, fulfilling of early spring requirements causing some reaction in various lines. The ground wood market is anxiously watching developments, believing that the newsprint situation must be straightened out by the authorities in the very near future or else the entire paper industry will be weakened due to the fact that newsprint manufacturers will turn to the making of other grades of paper to keep in operation. The waste paper industry is awaiting the outcome of the hearing on May 14. The board market is comparatively steady.

Salesmen's Membership Drive

George K. Gibson, popular Mosinee sales executive in this territory and chairman of the membership committee of the Middle West Division of the Salesmen's Association of the Paper Industry, has announced the acceptance of four new members into the association—W. A. Wrase, Central Paper Company; F. X. Brucker, Hartford City Paper Company; R. M. Carson, Fort Howard Paper Company, and A. L. Brown, Oxford Paper Company. From the offices of R. C. Johnson, Northwest Paper Company, and vice-president of the division, comes word that Dick Cook, chairman of the golf committee, has everything all set for the summer golf season. Here are the clubs—and the dates: May 25, Exmoor Country Club; June 15, Chicago Golf Club; July 20, Bob O'Link Country Club; August 17, Knollwood Country Club; September 14, Skokie Country Club. Temporary arrangements have been made for the wind-up event on October 5 at Olympia Fields. The date will be in line with the dates of the fall meeting of the National Paper Trade Association. Guests seeking information on these tournaments may reach Dick Cook at 400 West Madison street, telephone Randolph 8833.

Tax on Paper Products Analyzed

A little pamphlet, "Taxed and Untaxed," issued by E. E. Mattuschek, Wisconsin accountant, gives some interesting figures on the tax on paper products with the following interesting foreword: "There is also a tax on jute fabric and jute yarn. The reason for these additional taxes is this: The manufacturers of jute fabric could see no reason why the cotton manufacturers should get all the benevolent 'protection' from the Government. They demanded protection, too—another concession to an organized minority. And then the paper manufacturers wanted to get out of the rain.

"So we now have the following additional 'boloney taxes': Paper tax, 2.04 cents per pound weight of paper on multi-wall paper bags; 3.36 cents per pound weight of paper processed into coated paper bags; 2.14 cents per pound weight on open-mesh paper fabric processed into bags; 0.715 cents per pound weight on paper processed into towels, and 4.06 cents per pound weight on paper processed into paper tape. Jute tax: 2.9 cents per pound of jute processed into bags or into jute yarn processed into twine of a length of 275 feet."

Mr. Mattuschek's stated reasons for giving these figures and others is to point out that there really is a Federal Sales Tax in the form of processing taxes and that a simple out-in-the-open sales tax levied not upon "the poor man's bread and garments" but upon the less essential things purchased, will be just as productive of revenue and fairer to the common man.

News of the Trade

Several Chicago paper houses took advantage of the nineteenth annual convention of the Illinois Booksellers and Stationers Association, held at Peoria, Ill., on May 8 and 9, to display their wares to a large and representative crowd of merchants. Included in the exhibitors were Bradner Smith & Co., the Chicago Paper Company and the Southworth Company, all of whom had excellent exhibits in the exhibit hall of the Pere Marquette Hotel. A full line of stationery and paper for school and office use featured the exhibits.

George Birkenstein, member of the firm of S. Birkenstein & Sons, Inc., has been elected first vice-president of the Purchasing Agents Association of Chicago for the 1934-1935 year. Mr. Birkenstein is widely known to waste paper executives as head of the Waste Material Dealers Association, of which the waste paper industry is an important division.

The Chicago paper buying fraternity is showing not a little interest in the "Warren Workbook," a guide book for planning printing, published by the S. D. Warren Company. "Certain new conditions," says the copy describing the 'Workbook,' "have been set up in the paper business to ensure as far as possible the mest economical use of printing and paper making machinery," the Workbook making clear these new conditions and offering suggestions to printers to take full advantage of them. The Workbook contains five sections devoted to size selections, avenues of saving, formulas for achieving variety, formulas for the selection of paper and mechanical procedure.

Link-Belt Announces New Stoker Book

Link-Belt Company has just published an interesting book, "Firing Method Modernized For Profit," giving a comparison of hand firing and controlled automatic underfeed firing of boilers from 10 to 250 B.H.P. This book illustrates in graphic and pictorial form such features as smoke elimination, uniform temperatures and pressures, coal savings, firing efficiency, etc., etc.

A copy can be obtained by asking for book No. 1419 and addressing Link-Belt Company, 2410 W. 18th street, Chicago, Ill.

Forest Fires Menace Paper Mills in Wisconsin

Yards of Mosinee Paper Mills Co. Ignited Three Times—Mill Fire Department's Vigilance Prevents Flames From Gaining Headway—Small Fires Also Reported at Badger Paper Mills Plant at Peshtigo—Some Pulpwood Losses Suffered

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., May 14, 1934.—Drought responsible for more than a hundred forest fires this spring has been a menace to paper mills adjacent to timber areas and in one instance caused great danger to the buildings of the Mosinee Paper Mills Company, Mosinee, Wis. Thus far the total burned over area is approximately 20,000 acres, with no serious losses of timber.

The fire, which spread into the village of Mosinee, ignited the Mosinee Paper Mills Company yards three times, but the mill fire department's vigilance prevented the flames from gaining any headway. The firemen and the workers drenched the buildings and kept them that way until the danger was past. Seven dwellings in the vicinity of the mill were burned. Some pulpwood losses were suffered by the Joseph Dessert Lumber Company and the Mosinee Land, Log and Timber Company, the total estimate being 2,000 cords.

Drastic measures have been taken by both Earl W. Tinker, U. S. regional forester, and Brig. Gen. Ralph M. Immell, acting head of the Wisconsin Conservation Commission, to prevent further fires. No camp fires or smoking will be permitted in any forest area, and no fire may be started without permission. Violations will be made a punishable offense and several prosecutions already are in progress.

A small fire also was reported at the Badger Paper Mills, Inc., Peshtigo, Wis., last week. A blaze started in the cutter room but was extinguished by the sprinkler system with practically no loss.

News of the Industry

Remodeling of the Mead Paper Corporation's recently acquired mill at Menasha, Wis., is proceeding rapidly. It was formerly the Island Paper Company mill. The old generating room was found to be beyond repair and is being razed. The engine and boilers will be junked. Other old and defunct parts of the mill are being torn down, and two wings were dismantled. Broken windows have been replaced and the exterior is being repainted. Overhauling and installation of new equipment also is moving rapidly.

Wisconsin probably will have one of the largest delegations at the fifteenth annual convention of the American Pulp and Paper Mill Superintendents Association at Poland Spring, Me., June 20, 21 and 22, according to indications. The association has a large membership in Wisconsin mills, and one of its main centers of interest and activity has been in this state, where it was founded.

George J. Schneider, of Appleton, Wis., former congressman, accompanied John P. Burke, Fort Edwards, N. Y., to International Falls, Minn., last week to assist in settling a strike among pulp and paper mill workers there. Mr. Burke is president of the International Pulp, Sulphite and Paper Mill Workers, and Mr. Scheider is vice-president of the International Brotherhood of Paper Makers.

The dredging and extension of the shore of Little Lake Butte des Morts at Menasha, Wis., to remove the offensive mill waste accumulating there has been blocked by some of the property owners. Consent of all of them was necessary to an easement in favor of the city, but some insisted the new fill became their private property.

A flag pole 100 feet in height, used for many years on the Island paper mill property, has been given to the board of education by the Meade Paper Corporation, the new owners. The pole will be transferred to a new school building.

J. J. Plzak, of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., and F. H. Rosebush, of the Nekoosa-Edwards Paper Company, Port Edwards, Wis., have been given signal recognition for their safety work. They have been appointed by Governor A. G. Schmedeman, of Wisconsin, on a special committee to study street and highway safety.

Set-up Paper Box Hearing

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., May 16, 1934.—Hearing was held here last week on a number of amendments proposed for the code governing the set-up paper box manufacturing industry before Assistant Deputy Administrator F. G. Lowthorp.

Howard P. Beckett, of Philadelphia, secretary of the code authority for the industry, presented the amendments which included, among others, the first itemized budget of estimated administration expenses to be submitted for the approval of the NRA.

Other amendments offered at the hearing were: (1) To require any firm or individual desiring to install additional equipment to obtain "a certificate of necessity and convenience" from the Administrator; and (2) To empower the code authority to determine when an emergency exists as a result of destructive price-cutting, and to impose a lowest reasonable cost below which products of the industry then may not be sold.

Pursuant to the provisions of the proposed amendment to Article II, the Code Authority has submitted for the approval of the Administrator, its budget of estimated expense as follows:

Executive Expense— Meetings of Code Authority, Board of Directors, Necessary Committees	
Office Salaries	6,200.00
Office Fixtures— Mechanical Equipment	250.00
Telephone & Telegram	1,800.00
Stationery & Printing	3,500.00
Postage	2,500.00
Office Expense— Supplies	300.00
Office Rent	3,000.00
Miscellaneous Expense— Business Reports, Auditing Books, U. S. Tax on Checks, Books, etc.	500.00
Cost Supplies— To Maintain Inventory, Estimating Manuals, Charts of Accounts	7,000.000
Piracy of Design Expense	2,000.00
Staff Traveling Expense	6,000.00
Executive Salary & Retainer Expense	24,000.00
Accountant, Investigation, Statistical Work Expense	20,000.00
Total	$85,050.00

James T. Shea Honored

[FROM OUR REGULAR CORRESPONDENT]

SPRINGFIELD, Mass., May 12, 1934—James T. Shea, president of the United States Envelope Company, has been appointed as an alternate industrial member of the New England Regional Labor Board, according to an announcement by the National Labor Board.

British Demand for Canadian Pulpwood Grows

Switch From Scandinavian Countries to Dominion Reported by British Board of Trade—Canada Leads Countries Exporting Soft Woods to United Kingdom During First Quarter by Large Margin—Polish Lumber Exports to Britain Rank Second

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, QUE., May 14, 1934—The lumber trade is so closely allied with the business of the leading pulp and paper manufacturers that the revival in export demand now in evidence is a favorable factor in relation to their earnings. According to statistics received by the Montreal Board of Trade from the British Board of Trade an "amazing" change has occurred in the source of Britain's imports of sawn and planed softwoods, this having been switched largely from Scandinavian countries to Canada.

Canada comes right at the top of the list of countries exporting sawn and planed softwoods to Britain during the first quarter of the present year, it is revealed, contributing over one-third of all the wood of that type imported by the United Kingdom. The increase, moreover, is calculated without reckoning on the ten per cent preference for Empire timber which Canada shares with Britain.

During the period from January 1 to March 31, according to the information received here, British imports of sawn woods totalled 613,858 loads, of which Canada's share was 211,869 loads. During the corresponding period of 1933 Canada's exports of sawn and planed softwoods amounted to 55,283 loads—little more than one-quarter of the present export—while in the same period of 1932 the Dominion only exported 19,698 loads.

At the same time it is pointed out that it must be taken into consideration that British Columbia wood, for instance, can be exported all the year round, while Russian, Finnish and Swedish exports of timber to Britain during the period under consideration were necessarily limited, by reason of climatic conditions, to only a few open ports on the Baltic. Even allowing for this, however, it is claimed that the increase in the trade is remarkable, while moreover there is the prospect of a much larger import than last year's from Canada being seen during the remainder of the season.

Next to Canada in the quantity of exports to Britain of this nature comes Poland, which during the three months ended March 31 sent 118,171 loads—little more than half the amount of the Dominion's export. During the corresponding period of 1933 Poland shipped 63,416 loads to Britain, while the amount in the first three months of 1932 was 39,404. Exports from other countries to Britain remained about the normal figure, those from Sweden being slightly less.

The Pulp Trade of Japan

J. A. Langley, Canadian Commercial Secretary in Tokyo, reports to the Canadian Department of Trade and Commerce that along with a 10 per cent increased production of paper and a 39.3 per cent production of rayon, the consumption of pulp in Japan in 1933 increased accordingly, resulting in a larger domestic manufacture and also in increased imports. No official figures of the domestic production are as yet available, but according to reliable information, the production of sulphite pulp for 1933 amounted to 372,881 long tons, and of groundwood pulp to 310,581 long tons. Total consumption of pulp in Japan in 1933 amounted to 584,640 long tons as compared with 653,127 tons in 1932, an increase of 11.4 per cent. The importation of pulp into Japan during 1933 when compared with 1932 showed an increase of 58.1 per cent in quantity and 76.6 per cent in value. It is estimated that about two-thirds of the total imports are used in the manufacture of rayon. The number of plants is increasing and many inquiries have been received for Canadian pulp suitable for use in Japan. It is quite possible that if new Canadian suppliers could compete in price with American and Norwegian, there would be a large market available in Japan for Canadian pulp as the Dominion is more favorably situated than other sources of supply. Quantitatively Canada is still the principal supplier with nearly 30 per cent of the total imports during 1933, followed by the United States, and by Norway, Sweden, Germany, and other European countries.

Price Bros. Sales to Beaverbrook Interests

In view of Lord Beaverbrook's association with the plans now being arranged for the reorganization of Price Bros. & Co., Ltd., the following details with respect to the Beaverbrook tonnage purchased on this side of the Atlantic on behalf of the *London Daily Express*, are presented in official correspondence quoted by the *Montreal Star:*

"We purchased from Price Bros. from January 1, 1932, to December 31, 1933, 93,090 tons of newsprint at an average price of £10. 12. 8 per ton.

"We also bought from the International Paper Company during the same period 75,759 tons, at an average price of £10. 7. 9 per ton, and from W. V. Bowater & Sons 60,000 tons at an average price of £10. 12. 2.

"You will see that Price Bros. received a higher figure for newsprint than either of the other two firms.

"The *Daily Express* did not place any tonnage with Price Brothers in 1934."

Booth Mills Re-Open

From Ottawa it is announced that after three years of idleness, the timber mill of the J. R. Booth Company, of Ottawa, is now in operation. In addition, officials said that the McLaughlin mill at Arnprior, Ont., which will operate on contract by the Booth company, would start next week.

"Red Streak" Gummed Papers

The Brown-Bridge Mills of Troy, Ohio, announces that in the future its entire line of gummed papers, hollands and cloths in rolls will be identified by the name of "Red Streak." Each roll of tape will bear a red streak across its face near the end of the roll. Each bundle of tape will carry an attractive three-color label identifying the contents.

Attractive advertising helping to aid the merchandising of Red Streak products are nearing completion. These will be furnished all merchants handling this line. Gummed materials that will be so marked include sealing tapes, box stay, hollands, veneer tape, gummed cambric, combination cloth and paper tapes and specialties in roll form.

Philadelphia Paper Market Fairly Steady

Both Fine and Coarse Paper Divisions Exhibit Strong Undertone—Stout Resistance Experienced to Anything Further Than Usual Summer Decline—Paper Board Mill Demand for Lower Grades of Paper Stock Rather Restricted

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., May 14, 1934—The past week closed and the new one begins with stout resistance to anything further than the usual seasonal decline. And, while the trade here is experiencing what might be termed a spotty market, a very constructive tenor is manifested by those in the fine and coarse paper divisions.

Price Reporting Plan Effective

During the week there was mailed out from the headquarters of the Philadelphia Paper Trade Association, a letter issued by the Subcommittee for the Philadelphia Area, reading in part as follows: Pursuant to the order of the Code Authority of the Paper Distributing Trade, on April 26, 1934, notice was given of the adoption of a Price Reporting Plan on kraft papers.

It now being evident that 25 per cent in number and dollar volume of the known members of the trade selling kraft papers have filed their prices, in accordance with regulations of the Code Authority for such filing, notice is hereby given to all members of the trade selling kraft paper that said Price Reporting Plan is now in operation, according to list which represents the lowest filed price, statement of terms, conditions, etc., so filed.

It further states that in accordance with Section 2, Article VIII, of the Code, these prices are declared in effect on kraft papers, and that no member of the trade shall sell such article within the Philadelphia Trading Area at prices lower or terms more favorable than those set forth, until change is effected pursuant to the provisions of Section 2-a of Article VIII of the Code of Fair Competition for the Paper Distributing Trade.

It exhorts all members of the trade to study the Code of Fair Competition for the Paper Distributing Trade and particularly the provisions relating to and governing Price Reporting Plan in order that they may understand fully their privileges and obligations thereunder.

At this writing, the requisite 25 per cent. in number and dollar volume of the Bag Division of the Paper Trade Association has not filed its prices under the provisions of the Price Reporting Plan, but it is hoped that within the next few days complete returns will have been made.

Association Activities

At the next regular meeting of the Philadelphia Paper and Cordage Association, Inc., it was stated by President George K. Hooper, that there will be held a symposium in which all the members of this association are invited to participate. Primarily, the purpose of this association is to cultivate closer fellowship between paper and cordage salesmen and to broaden the knowledge of the cost of doing business and other essentials looking towards the broadening of the trade outlook.

On May 22, 23, 24 and 25, those engaged in the paper box industry will meet in convention in New York. A tentative program has been arranged, commencing on Tuesday with a meeting of the Code Authority, and on Wednesday, President William P. Datz, Jr., will deliver his address, after which executive secretary Howard P. Beckett will present the Commissioner's Report, explaining the convention plan, followed by Group Meetings; in the evening there will be an entertainment at the famous Casine de Paris.

Thursday will be given over to answering questions by speakers on subjects of their addresses or reports, terminating in a banquet at which Clarence M. Owens, convention chairman, will be toastmaster.

On Friday, Deputy Administrator W. W. Pickard will discuss the N.R.A. program; Annual Survey of The Setup Paper Box Manufacturing Industry will be presented by W. Clement Moore, and "The First Year of The New Deal" will be the topic of Henry T. Rainey. Regular routine business, consisting of election of officers of the Eastern Division of the National Paper Box Manufacturers Association and a meeting of the newly elected Board of Directors, will follow.

Paper Stock Market Quiet

In the waste paper market, it is apparent that orders are wanting for most of the low grades, and that consuming mill demand was of a compass failing to take up the supply reaching the market. No price changes were recorded, prevailing values about holding their own in the face of the narrow scope of the market.

The hope of the industry is the N.R.A. Supplemental Code and the helpful support of the Government in the effort to place the waste paper business on a profitable basis. It is the contention of those in this branch of the industry that minimum prices should be established, below which no packer, dealer, broker or producers' agent shall sell waste paper to any mill; these prices to be on a fair and reasonable level and dependent on the different sections of the country.

In short, every aid, provision or privilege given by the Government to other industries should be accorded the waste paper industry, if the waste paper industry is to recover to a degree where it can continue to hire employees, pay wages, function under the N.R.A., and show at least a reasonable measure of profit to those within it.

Wm. F. Mohen Promoted

William F. Mohen, formerly general sales manager of Scott Paper Company and member of its board of directors, with offices in the Lewis Tower Building, has been elected vice president in charge of sales.

Code Authorities Recognized

WASHINGTON, D. C., May 16—Edgar Rickard, of the Pejepscot Paper Company, New York City, has been recognized by NRA as a member of the code authority for the newsprint industry. Others recognized for the authority by NRA include: A. L. Hobson, St. Croix Paper Company, Boston; C. K. Blandin, St. Paul; A. R. Graustein, International Paper Co., New York; R. H. M. Robinson, Minneapolis; William A. Whitcomb, Great Northern Paper Company, Boston, and I. Zellerbach, San Francisco.

Open Paper Drinking Cup and Round Nesting Paper Food Container: Hugh Moore, Easton, Pa.; Henry Wiss, Lily-Tulip Cup Corporation, New York; R. J. Kieckhefer, American Lace Paper Company, Milwaukee; Donald B. Logan, Worcester, Mass.; Alexander Herz, New York; E. W. Skinner, Fulton, N. Y.; and Robert C. Fenner, Vortex Cup Company, Chicago.

Lake States TAPPI Elects Officers

Chairman R. J. LeRoux presided at a banquet and party given by the Lake States Section of TAPPI at the Terrace Gardens, Appleton, Wis., on May 8. Nearly two hundred members and friends of the section gathered from all parts of Wisconsin, Illinois, and Michigan to help close the fourth successful season of the local chapter. Even California was represented by Jack P. Bonardi of the Great Western Electrochemical Company of San Francisco.

The only business of the evening was the election of officers for the ensuing year. The following were elected by unanimous vote: A. T. Gardiner, Combined Locks Paper Company, chairman; G. H. McGregor, Institute of Paper Chemistry, vice-chairman and S. D. Wells, Combined Locks Paper Company, secretary-treasurer. The retiring officers are: R. J. LeRoux, Consolidated Water Power and Paper Company, chairman; A. T. Gardiner, Combined Locks Paper Company, vice-chairman; and G. H. McGregor, Institute of Paper Chemistry, secretary.

The remainder of the evening was devoted to the banquet, refreshments, and entertainment.

The Lake States Section will resume its monthly meetings on the second Tuesday of each month at the Conway Hotel, Appleton, Wisconsin, next October.

Among those present were the following:

F. L. Aldrich, Interlake Pulp and Paper Company; Alfred Agrell, Patten Paper Company; Martin Auchter, Hoberg Paper and Fibre Company; A. W. Asmuth, Wisconsin Tissue Mills.

Russell Brenzel, Thilmany Pulp and Paper Company; O. T. Birkness, Wallace & Tirnan; Earle O. Bryant, Institute of Paper Chemistry; Paul Boronow, Valley Iron Works; Harold Blahnich, Kimberly Clark Corporation; W. H. Burns, Valley Iron Works; Al Bachman, Kimberly-Clark Corporation.

W. C. Christensen, Hoberg Paper and Fibre Company; G. L. Cavaness, Appleton; R. C. Crain, Whiting-Plover Paper Mills; G. J. Chapleau, Wisconsin Tissue Mills; W. E. Clark, De Pere, Wis.; F. A. Courchane, Jr., Kimberly-Clark Corporation; Hans Clausen, Whitmore Manufacturing Company; C. M. Carroll, Combined Locks Paper Company.

Roy Davis, Interlake Div. Consolidated Water Power and Paper Company; M. L. Downs, Institute of Paper Chemistry; J. T. Doerfler, Kimberly-Clark Corporation; G. Duemling, Globe Steel Tubes Company; E. E. Den Doovan, Hoberg Paper and Fibre Company; M. N. Davis, Kimberly-Clark Corporation; Robert DeWitte, Hoberg Paper and Fibre Company; DeBambe, Lewis, Hoberg Richmond, Interlake Paper Mills; R. M. Radsh, Appleton Machine Company; Robinson, S. J., Institute of Paper Chemistry; Robert Rogers, Kimberly-Clark Corporation; Con. Riggles, Kimberly-Clark Corporation.

Clayton Ewing, Marathon Paper Mills Company; N. H. Foley, Marathon Paper Mills; Wm. H. Falatick, Thilmany Pulp and Paper Company; James Foote, Fox River Paper Company; Wm. A. Fannon, The Fannon Trading Company, Inc.; J. A. Foley, Kimberly-Clark Corporation.

A. T. Gardner, Combined Locks Paper Co.; W. B. Giese, Hoberg Paper and Fibre Company; Geo. R. Gerritts; L. L. Griffiths, Heller & Merz Co.; H. W. Goechnauer, Northern Paper Mills.

J. A. Hanson, Badger Paper Mills; Ward Harrison, Institute of Paper Chemistry; A. B. Hansen, Marinette; Herb Heilig, Appleton; M. H. Haskins, Hoberg Paper and Fibre Company; O. E. Hagen and A. T. Hudson, Kimberly-Clark Corporation; C. M. Holt, Pennsylvania Salt Company; Harold W. Haugen, Kimberly-Clark Corporation; Walter Holzer, Institute of Paper Chemistry; E. C. Hilfert, Riverside Paper Company; F. J. Hoar, Stebbins Engineering Company.

E. H. Johnson, Northern Paper Mills, P. E. Jones, Patten Paper Company; E. C. Jacobi, Standard Oil Company; F. H. Johnson, Jr., Consolidated Power & Pulp Co.

A. F. Kletzien, Fox River Paper Company; H. L. Krieger, Thilmany Pulp and Paper Company; Robert E. Kissel, Hoberg Paper and Fibre Company; M. J. Ketter, Hoberg Paper and Fibre Company; Otto Kress, Institute of Paper Chemistry; Fred Kranhold, Kimberly-Clark Corporation; W. C. Kowaleski, Northern Paper Mills; Wm. Kolb, Combined Locks Paper Co.; R. V. Knapp, Bailey Meter Company; B. F. Kueck, Bergstrom Paper Company.

R. J. LeRoux, Interlake Paper Mills; E. M. Leavitt, Thilmany Pulp & Paper Co.; J. A. Limpert, Kimberly-Clark Corporation; Loyd Lang, Kimberly-Clark Corporation; A. Lewenstein, Appleton Coated Paper Company; E. F. Lenz, Hoberg Paper & Fibre Company; B. E. Lever, Northern Paper Mills.

Hoke Martin, Mathieson Alkali Company; G. H. McGregor, Institute of Paper Chemistry; L. J. McNamara, Wausau; J. W. McIntyre, Institute of Paper Chemistry; C. J. McMahon, Appleton Woolen Mills; I. R. McCall, Milwaukee, Wisconsin; Rudolph W. Meyer, Badger Paper Mills; C. Murray, Crane Company; R. D. McCarron, Escanaba Paper Company; M. V. Molsherry, General Electric Company; Ernst B. Morse, Appleton; H. W. Mollison, National Tube Company.

J. J. Nylund, General Dyestuffs Corp.; C. H. Nystrom, Northern Paper Mills; Joseph K. Post and L. B. Powers, Kimberly-Clark Corporation; D. F. Peterson, Bergstrom Paper Company; L. A. Pflieger, Marathon Paper Mills; William Prebbanow, Consolidated Water Power and Paper Co.; P. A. Paulson, Appleton; W. E. Phillips, Mathieson Alkali Works; L. B. Penhallow, Wadhams Oil Company.

H. A. Rothschild, Kimberly-Clark Corporation; H. B. Richmond, Interlake Paper Mills; R. M. Radsh, Institute of Paper Chemistry; Robert Rogers, Kimberly-Clark Corporation; Con. Riggles, Kimberly-Clark Corporation.

C. R. Seaborne, Thilmany Pulp and Paper Company; C. E. Saecker, Appleton Machine Company; G. A. Spaulding, Kimberly-Clark Corporation; J. Glenn Strieby, Kimberly-Clark Corporation; W. H. Swanson, Kimberly-Clark Corporation; Bernard F. Smith, Kimberly-Clark Corporation; H. A. Schauer, Hasco Valve & Machine Company; J. A. Staidle, Thilmany Pulp & Paper Company; John Stamiak, Marathon Paper Mills Company.

A. H. Theurer, Appleton Woolen Mills Company; M. J. Taylor, Green Bay; E. J. Treiber, Wadhams Oil Company.

Edward H. Voigtman, Kimberly-Clark Corporation; Ervin J. Vickman, Hoberg Paper and Fibre Company; Reinhold Vogt, Interlake Paper Mills; H. L. Voss, Mosinee Paper Mills.

Sidney D. Wells, Combined Locks Paper Company; E. R. Williams, Neenah Paper Company; T. E. Xistriss, Valley Iron Works; Ronald Youngson, Marathon Paper Mills; R. C. Zilske, Interlake Pulp and Paper Company; W. M. Zahn, Marathon Paper Mills Co.; Robert Zaumeyer, Kimberly-Clark Corporation.

Recent Westinghouse Developments for the Paper and Pulp Industry

Electronic Speed Regulator for Single Motor Paper Machine Drive

In the operation of the paper machine it is essential, in producing high grade uniform products, to maintain constant and uniform speeds. Furthermore, the most efficient overall performance of the paper machine is assured when the lineshaft is accurately maintained at a constant speed regardless of changes in operating conditions such as load, mill frequency, or applied voltage. To accomplish these results single motor paper machine drives have been provided with speed regulating equipment.

The recently developed Westinghouse electronic speed regulator for paper machine drive was designed to increase the sensitivity and improve upon the general overall performance of existing types of electro-mechanical regulators. This electronic speed regulator is free from all mechanical parts such as are common to the electro-mechanical types of speed regulators. The absence of moving mechanical parts increases both the sensitivity and the speed of response of the regulator. The regulator is provided with effective anti-hunting features which permit stability of operation over the entire operating speed range. The anti-hunting feature is obtained entirely through the use of electrical circuits, thus eliminating the use of dash pots and other mechanical parts ordinarily provided with the older types of regulators. The electronic speed regulator functions without time delay, friction, or moving mechanical parts and therefore does not require constant maintenance or delicate mechanical adjustments to assure its proper functioning. The use of this type of speed regulator assures consistent results as well as a very high degree of sensitivity and accuracy.

Braking Generators and Tension Control

In the operation of unwinding stands, in connection with winders or similar equipment it is necessary to maintain uniform tension between the unwinding stands and the winder or other processing machinery in order to insure the most satisfactory results. The unwinding stand usually carries a core wound roll and as the paper is unwound from a full to an empty core, it is necessary to adjust the braking effort in order to maintain a uniform pull in the sheet. Ordinarily the braking effort is obtained by means of a mechanical brake having the braking drum driven from the core shaft of the unwinding stand. Some years ago, the Westinghouse Company developed a system of electrical regenerative braking with automatic tension control for unwinding stands of this type. This system includes a direct current generator which is driven from the shaft of the unwinder. The output of this generator

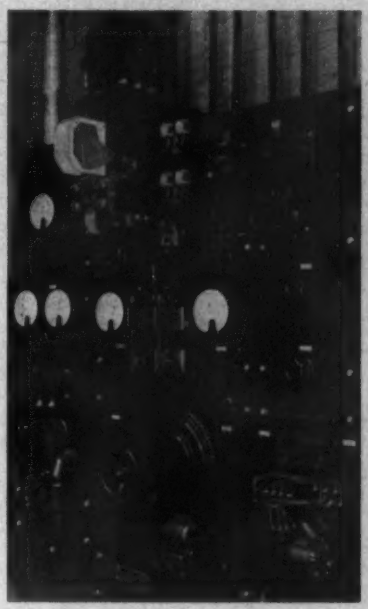

FIG. 3.
Installation of Westinghouse control and speed regulating equipment at the Michigan Carton Co., Battle Creek, Mich.

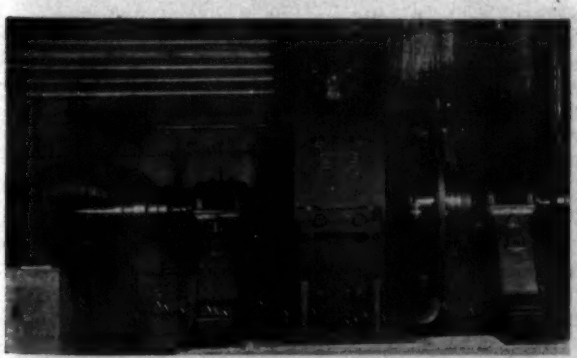

FIG. 1.
Installation of Westinghouse single motor drive at Michigan Carton Co. Battle Creek, Mich. 300 hp., 250 volt, 450 r.p.m. motor driving line shaft.

FIG. 2.
Installation of Westinghouse 250 kw. Synchronous motor generator at the Michigan Carton Co., Battle Creek, Mich.

is automatically controlled by means of a special regulator which serves to maintain constant current output of the generator by adjusting the excitation of the generator to compensate for the changes in its operating speed from a full to an empty core. In those cases where the winder or similar apparatus receives its energy from a direct current source, the braking generator can be arranged to feed back into this source. Where the equipment is driven by other means the braking generator can be arranged to feed back through a series wound d-c. motor connected to the main drive. A number of these drives have been placed in operation, all of which have given very satisfactory results. The tension is constantly maintained without the necessity of repeated manual adjustments as with the mechanical brake. The mechanical brake which ordinarily requires frequent attention and maintenance is eliminated and the braking effort instead of being dissipated in brake lining wear is converted into useful energy and returned to the drive.

Improvements this year have greatly increased the usefulness of this type of braking. The design of the control equipment has been modified so that tension may be applied to the sheet while the equipment is at standstill. The control has been arranged so that the operators may remove tension permitting them to readily unwind sufficient paper from the roll for threading after which tension may again be applied preparatory to placing the equipment in operation. This braking generator and tension control equipment has been so designed that it may be added to existing drives or made a part of the original layout.

Trans-O-Meter

The industry has long been in need of an accurate instrument which would permit measuring the transparency of flat materials. A recent development in this field is the Westinghouse Trans-O-Meter. This instrument accurately measures the actual transparency of the sheet in terms of the human eye sensitivity and the percentage of transparency is shown on a direct reading instrument. This type of sensitivity is made possible through the use of the "Photox," a recently developed voltaic type photocell, which has a color response sensitivity practically identical with that of the human eye. Due to these characteristics of the "Photox," this meter indicates the transparency of either white or colored samples with the same degree of sensitivity as seen by the eye. The transparency indicated by the instrument agrees with the "show through" tests over black print or lines and other reliable methods of transparency determination. The use of the instrument involves only the reading of a meter, which is a direct indication of the transparency. This method of operation eliminates the human element from the observations. Paper samples do not have to be cut to any given size and a long strip taken over the full width of paper machine can be drawn slowly through the instrument and observations instantly made of any variation in transparency.

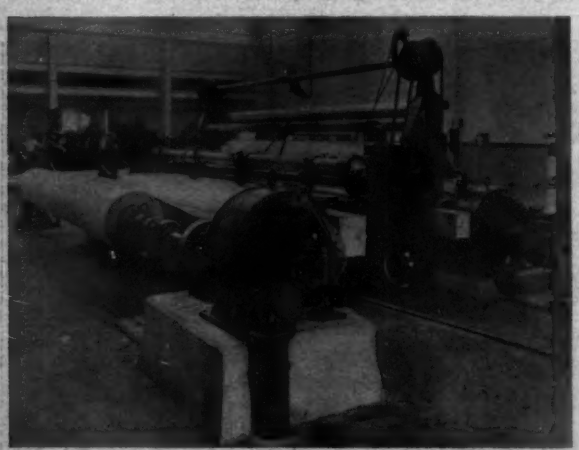

FIG. 4.
Westinghouse winder drive and braking generator equipment installed at the Maine Seaboard Paper Co., Bucksport, Me.

FIG. 5.
Westinghouse trans-o-meter for measuring transparency of paper or similar sheet materials.

The principle of the Trans-O-Meter is simple. It consists of measuring the amount of light a 25 watt lamp will pass through the sample. The light transmitted through the sample impinges on the "Photox" cell. This cell is connected to a sensitive microammeter which reads the "transparency" directly in percentage. The term "percentage transparency" is commonly used to designate the amount of light immerging from a material in comparison to the amount impinging upon it.

The Trans-O-Meter is built in a light steel case which has a convenient handle for carrying it. This case contains the complete device ready to be connected to a 110 or 115 volt direct current or alternating current supply. The device is provided with a voltage regulator to insure constant output from the lamp. The instrument is small, compact and portable.

Photo-Electric Color Matcher

The Photo-electric color matcher is a portable, comparatively inexpensive device recently developed for matching colors. The device is arranged to compare samples at 3 points of the visible spectrum by the use of suitable filters. The device indicates the degree to which two samples are matched, however, it does not serve to analyze color samples into their respective constituents. Slight color differences, hardly descernible to the human eye,

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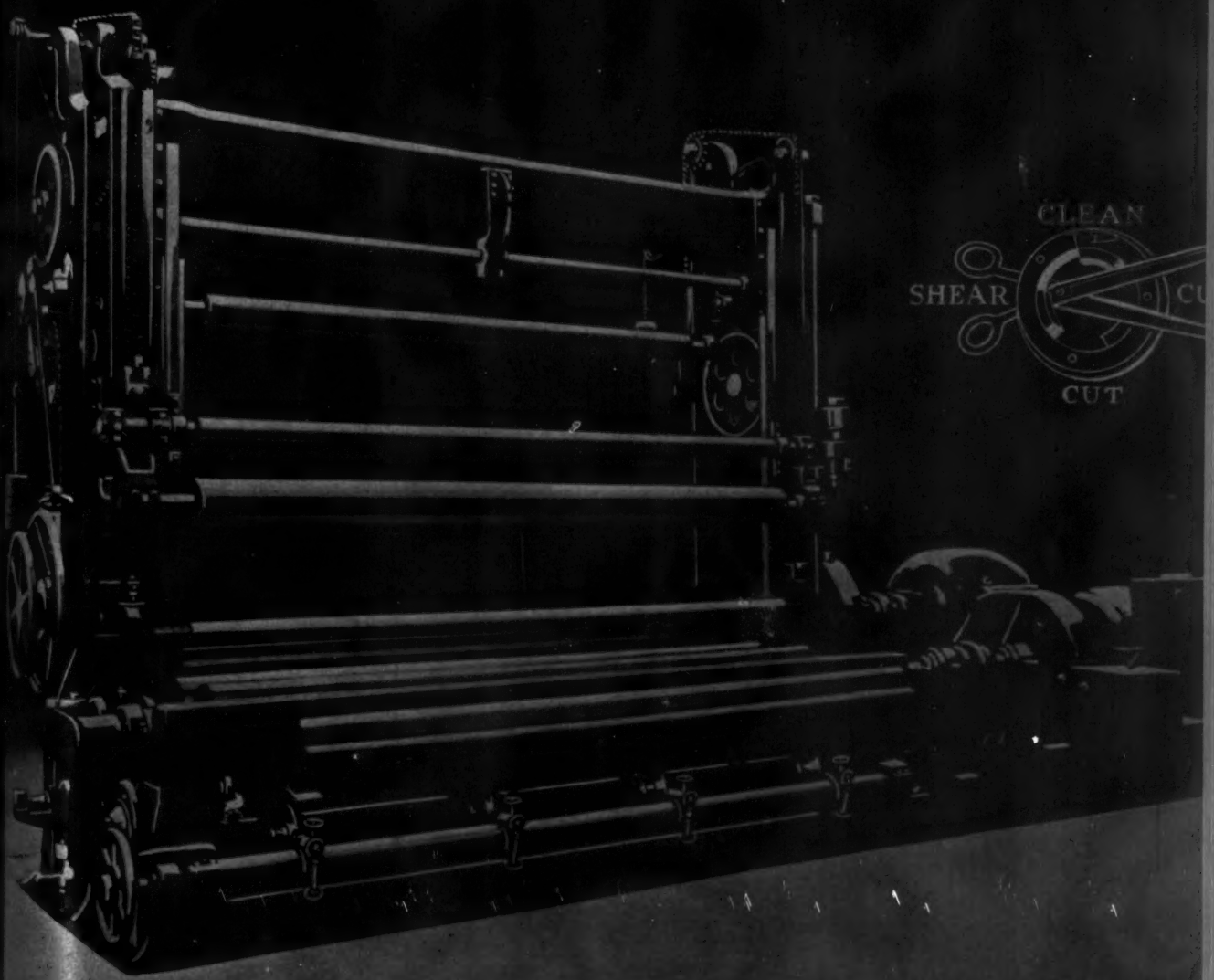

SAMUEL M. LANGSTON COMPAN

CAMDEN, NEW JERSEY

can be detected with little difficulty by the color matcher.

The optical system of the instrument is independent of daylight or artificial light. A standard concentrated filament lamp is run at low voltage to ensure long life. A three color light filter including blue, green, and red is mounted so that any one of these filters may be placed between the lamp and the concentrating lens. The concentrating lens and a mirror bring the light rays to the sample and a white integrating tube reflects these rays to the photo-tube, which is selected with a special color characteristic to give best operation with the lamp source. The matcher is arranged so that it may be placed over the samples or operated in the reverse position by placing the samples on the top of the matcher. The design of the unit is such that either light or dark samples may be tested with a high degree of sensitivity. The condition of the surface does not affect the accuracy of the matcher

The electrical circuit of the instrument comprises a low grid current amplifier tube, photo-tube, coupling circuit, and sensitivity control. A sensitive meter is provided for comparing the output of the electrical circuit obtained with the various samples being matched.

The instrument is light and portable and suitable for operation entirely from 115 volt, 60 cycle source.

Photo-Troller

The Photo-troller is an electronic tube controller which was recently developed for industrial application. The device consists essentially of a grid glow tube of the industrial type, a contactor and transformer assembled on a panel with other auxiliary parts and mounted in a sheet metal cabinet. This device may be actuated from a number of different sources including, a beam of light projected on the photo-tube, changes in resistance, or extremely small currents. Any one of these actuating means may be used to control the operation of the grid glow tube which in turn operates the contactor. The device is a rugged and dependable unit designed for industrial service. It may be applied to eliminate cumbersome or unreliable mechanical devices such as limit and flag switches, counters, indicators, and a number of other devices where the operation of an electrical contact can be utilized.

Register Cutter Control

During the past year there has been considerable activity in the field of automatic register cutter control and a number of improvements have been made to increase the sensitivity, accuracy, and reliability of this equipment. These automatic controllers make use of photo-electric tubes and electronic relays. The high degree of sensitivity and speed of response of these electronic devices make it possible to maintain the register of the cutting knife with marking on the sheet, at speeds considerably above those possible with manual control.

To permit of extremely accurate and consistent results at high operating speeds, a new type of photo-electric scanning head has been placed on the market. This scanning head operates on a differential principle employing the simultaneous output of two photo-cells. This new type of scanning head prevents faulty operation of the equipment due to variations in printing, variations in the color of the paper strip receiving the printing, or variations in supply voltage.

Synchro-Tie

Recent developments have made it possible to accomplish, by means of the electric motor, results which have heretofore been possible only through the use of the complicated and elaborate mechanical systems. With this synchro-tie system the rotors of two alternating current motors are electrically interlocked. The rotation of one of the units results in synchronous rotation of the second unit. With this system the rotors of these two units are as effectively locked together as if they were connected by a common shaft, although they may be located at any distance from each other and in any suitable position. Frequently these requirements of suitable location become very difficult of solution by mechanical means. With the synchro-tie system the torque is transmitted electrically between the units through the interconnection of their primary and secondary windings. When it is necessary to adjust the relative speeds of the two units of such a transmission, this may be accomplished by the introduction of a frequency changer unit, either in the primary or secondary circuit. Operation of the frequency changer permits operating one of the units of the synchro-tie at a higher or lower speed than the second unit. This function serves to eliminate the necessity of differential gears or mechanical speed changers. The torque capacity of such a system is only limited to the present limits of commercial motor design. During the past year a number of these synchro-tie systems were applied to drive where it was desirable to eliminate the complications of a suitable mechanical drive. This type of equipment is being ap-

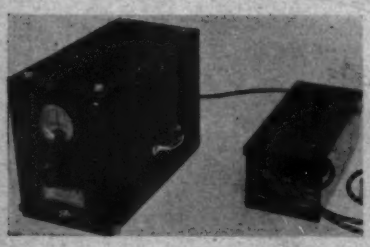

FIG. 6.
The Westinghouse color matcher.

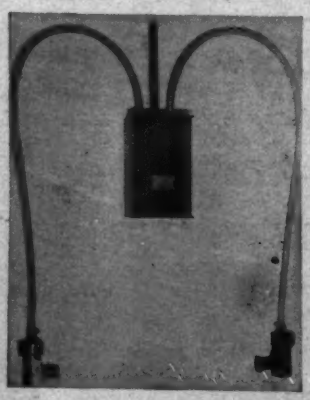

FIG. 7.
The photo-troller with flexible conduit to photo tube and light source.

FIG. 8.
Westinghouse thermo-guard motor.

plied to sectional paper machine drives to permit the proper adjustment of draws from the front side of the paper machine. The synchro-tie system has many applications in the Pulp and Paper Industry including the remote operation of valve mechanism, the remote indication of floats and similar devices, the tying together of conveyor systems, etc.

Thermoguard

A recent development in motor design is the thermoguard self-protecting motor. This new design incorporates a device built into the motor which accurately detects the operating temperature of the motor and serves to protect it against excessive heating. In the application of motors to the Paper Industry there are many cases where the protection afforded by standard types of industrial control is not adequate to meet the operating conditions. In such cases over-heating of the motor results and its life is materially shortened. This may occur either as immediate burnout or a gradual deterioration of the insulation. By supplementing the standard overload relay protection with a thermostat built into the motor, complete motor protection is assured.

Splash and Drip-Proof Motors

Conditions in the Pulp and Paper Industry frequently make it impossible to locate motor drives where water will not be splashed, or will not drip onto the motor frame. For applications such as these, the Westinghouse Company has recently designed and placed on the market a complete line of motors with splash and drip-proof protection. The design provides for suitable covers and baffles which prevent the entrance of water to the interior of the motors when either the machines or the floor are being washed with a hose stream.

Gearmotors

Practically all motor applications in the Paper Industry require some mechanical means for reducing the motor speed to a satisfactory operating speed. Several years ago the Westinghouse Company developed a line of gearmotors which combined the motor and speed reducer forming a neat and compact driving unit. Recently this line of equipment has been extended to include motor ratings from ½ to 75 h.p. and output speeds from 15 to 1550 r.p.m. The complete line includes direct current and squirrel cage and wound motor induction motors. The gearmotor provides compactness and ease of installation as the mounting and aligning operations are reduced to the minimum by having the motor and speed reducer built integral. Low operating speeds are obtainable at higher efficiency and power factor than by direct connected slow speed motors. The units consist of a single or double reduction speed reducer supplied with a standard motor. The gearing is all external type, single helical, steel gears and pinions. The use of this type of gearing assures smooth, quiet and highly efficient operation.

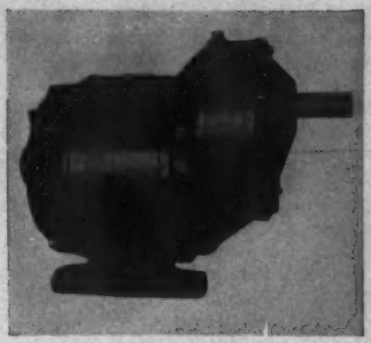

FIG. 10.
Westinghouse-Nuttall gear motor.

All shafts are mounted in anti-friction bearings. One bearing for the motor armature is mounted in the motor bracket and the other bearing is mounted in the speed reducer housing. Thorough lubrication is supplied to gearing and bearing, including the motor bearing mounted in the gear unit, by a simple, positive splash system. The single reduction gearmotors provide standard gear ratios up to 5 to 1 and the double reduction ratios up to 40 to 1. The Westinghouse gearmotor is a sturdy compact unit which operates at high efficiency with the assurance of reliable low cost performance in all classes of service.

Synchronous Motor Controllers

The wide application of synchronous motors in industry has made desirable a development of controllers for this

FIG. 9.
Splash proof motor.

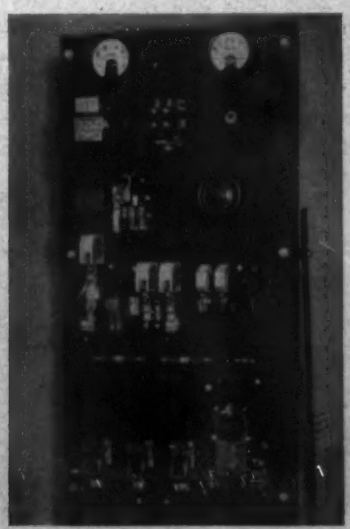

FIG. 11
Westinghouse full voltage synchronous-motor starter.

can be detected with little difficulty by the color matcher.

The optical system of the instrument is independent of daylight or artificial light. A standard concentrated filament lamp is run at low voltage to ensure long life. A three color light filter including blue, green, and red is mounted so that any one of these filters may be placed between the lamp and the concentrating lens. The concentrating lens and a mirror bring the light rays to the sample and a white integrating tube reflects these rays to the photo-tube, which is selected with a special color characteristic to give best operation with the lamp source. The matcher is arranged so that it may be placed over the samples or operated in the reverse position by placing the samples on the top of the matcher. The design of the unit is such that either light or dark samples may be tested with a high degree of sensitivity. The condition of the surface does not affect the accuracy of the matcher

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Register Cutter Control

During the past year there has been considerable activity in the field of automatic register cutter control and a number of improvements have been made to increase the sensitivity, accuracy, and reliability of this equipment. These automatic controllers make use of photo-electric tubes and electronic relays. The high degree of sensitivity and speed of response of these electronic devices make it possible to maintain the register of the cutting knife with marking on the sheet, at speeds considerably above those possible with manual control.

To permit of extremely accurate and consistent results at high operating speeds, a new type of photo-electric scanning head has been placed on the market. This scanning head operates on a differential principle employing the simultaneous output of two photo-cells. This new type of scanning head prevents faulty operation of the equipment due to variations in printing, variations in the color of the paper strip receiving the printing, or variations in supply voltage.

Synchro-Tie

Recent developments have made it possible to accomplish, by means of the electric motor, results which have heretofore been possible only through the use of the complicated and elaborate mechanical systems. With this synchro-tie system the rotors of two alternating current motors are electrically interlocked. The rotation of one of the units results in synchronous rotation of the second unit. With this system the rotors of these two units are as effectively locked together as if they were connected by a common shaft, although they may be located at any distance from each other and in any suitable position. Frequently these requirements of suitable location become very difficult of solution by mechanical means. With the synchro-tie system the torque is transmitted electrically between the units through the interconnection of their primary and secondary windings. When it is necessary to adjust the relative speeds of the two units of such a transmission, this may be accomplished by the introduction of a frequency changer unit, either in the primary or secondary circuit. Operation of the frequency changer permits operating one of the units of the synchro-tie at a higher or lower speed than the second unit. This function serves to eliminate the necessity of differential gears or mechanical speed changers. The torque capacity of such a system is only limited to the present limits of commercial motor design. During the past year a number of these synchro-tie systems were applied to drive where it was desirable to eliminate the complications of a suitable mechanical drive. This type of equipment is being ap-

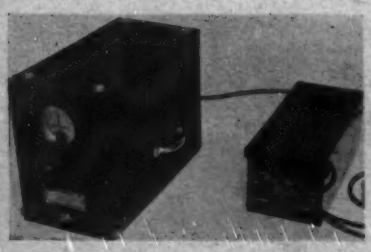

FIG. 6.
The Westinghouse color matcher.

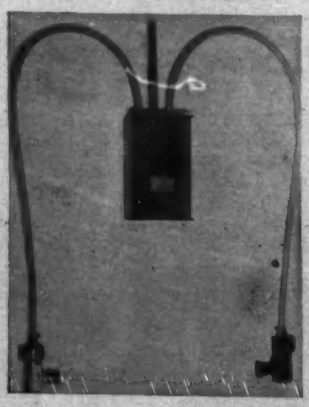

FIG. 7.
The photo-troller with flexible conduit to photo tube and light source.

FIG. 8.
Westinghouse thermo-guard motor.

plied to sectional paper machine drives to permit the proper adjustment of draws from the front side of the paper machine. The synchro-tie system has many applications in the Pulp and Paper Industry including the remote operation of valve mechanism, the remote indication of floats and similar devices, the tying together of conveyor systems, etc.

Thermoguard

A recent development in motor design is the thermoguard self-protecting motor. This new design incorporates a device built into the motor which accurately detects the operating temperature of the motor and serves to protect it against excessive heating. In the application of motors to the Paper Industry there are many cases where the protection afforded by standard types of industrial control is not adequate to meet the operating conditions. In such cases over-heating of the motor results and its life is materially shortened. This may occur either as immediate burnout or a gradual deterioration of the insulation. By supplementing the standard overload relay protection with a thermostat built into the motor, complete motor protection is assured.

Splash and Drip-Proof Motors

Conditions in the Pulp and Paper Industry frequently make it impossible to locate motor drives where water will not be splashed, or will not drip onto the motor frame. For applications such as these, the Westinghouse Company has recently designed and placed on the market a complete line of motors with splash and drip-proof protection. The design provides for suitable covers and baffles which prevent the entrance of water to the interior of the motors when either the machines or the floor are being washed with a hose stream.

Gearmotors

Practically all motor applications in the Paper Industry require some mechanical means for reducing the motor speed to a satisfactory operating speed. Several years ago the Westinghouse Company developed a line of gearmotors which combined the motor and speed reducer forming a neat and compact driving unit. Recently this line of equipment has been extended to include motor ratings from ½ to 75 h.p. and output speeds from 15 to 1550 r.p.m. The complete line includes direct current and squirrel cage and wound motor induction motors. The gearmotor provides compactness and ease of installation as the mounting and aligning operations are reduced to the minimum by having the motor and speed reducer built integral. Low operating speeds are obtainable at higher efficiency and power factor than by direct connected slow speed motors. The units consist of a single or double reduction speed reducer supplied with a standard motor. The gearing is all external type, single helical, steel gears and pinions. The use of this type of gearing assures smooth, quiet and highly efficient operation.

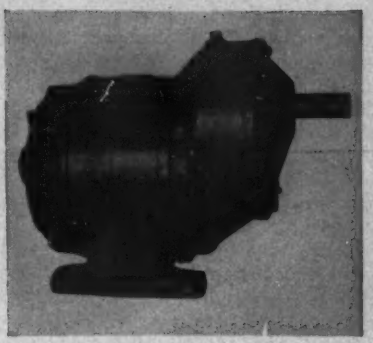

FIG. 10.
Westinghouse-Nuttall gear motor.

All shafts are mounted in anti-friction bearings. One bearing for the motor armature is mounted in the motor bracket and the other bearing is mounted in the speed reducer housing. Thorough lubrication is supplied to gearing and bearing, including the motor bearing mounted in the gear unit, by a simple, positive splash system. The single reduction gearmotors provide standard gear ratios up to 5 to 1 and the double reduction ratios up to 40 to 1. The Westinghouse gearmotor is a sturdy compact unit which operates at high efficiency with the assurance of reliable low cost performance in all classes of service.

Synchronous Motor Controllers

The wide application of synchronous motors in industry has made desirable a development of controllers for this

FIG. 9.
Splash proof motor.

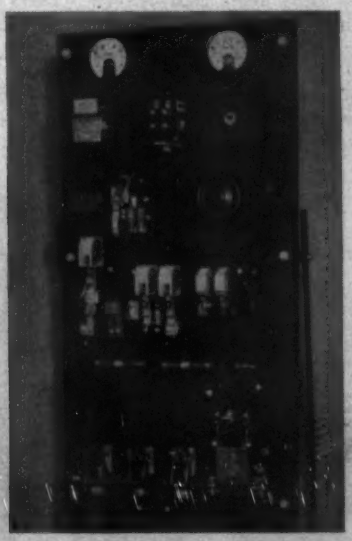

FIG. 11
Westinghouse full voltage synchronous motor-starter.

type of motor which would assure proper control sequence on starting as well as full motor protection during starting and operation, without the necessity of close personal supervision. In line with these requirements the Westinghouse Company recently developed a complete new line of synchronous motor controllers. This new line includes both semi-magnetic and full-magnetic types, arranged for either full or reduced voltage starting, and supplied for either high or low voltage circuits. The features of this new line include, automatic definite time field application; automatic field removal, re-synchronizing where load conditions permit, and overload and undervoltage protection.

For automatically applying field excitation after the motor has reached a speed slightly below synchronism, a definite time field application relay is provided. Definite time application of field excitation is an advanced feature of Westinghouse synchronous motor control. This method has the recognized advantage of utilizing the maximum synchronizing torque of the motor and assures positive synchronizing action under all load and voltage conditions. A synchronous motor when correctly applied has sufficient starting and pull-in torque to accelerate the motor to a speed from which it will synchronize if field excitation is applied. The time relay definitely assures that excitation will be applied, thus actually forcing the motor to exert its full synchronizing torque.

Automatic field removal is obtained through the use of a power factor relay. This relay which operates on the lagging power factor resulting from sub-synchronous opperation of the motor very effectively removes field excitation as soon as the motor pulls out of step. By virtue of the automatic field removal relay, furnished as standard equipment on Westinghouse starters, synchronous motors which have pulled out of step can be automatically resynchronized provided load conditions permit.

Full motor overload protection is provided by means of a 2 pole, hand reset, thermal relay which protects the motor, stator and amortisseur windings during starting or running. The relay, being of the thermal type, provides protection based on the work required of the motor and by virtue of its inverse time feature will not cause frequent interruptions of service.

Instantaneous under-voltage protection is provided as standard on all starters for voltages 600 and below. Time delay under-voltage protection is provided as standard on all starters 2200 volts and above. Time delay undervoltage can be supplied as an optional arrangement on starters for voltages 600 and below.

A timing relay which serves to initiate the transfer from the starting to the running connections on reduced voltage or part-winding controllers is furnished as part of the standard equipment.

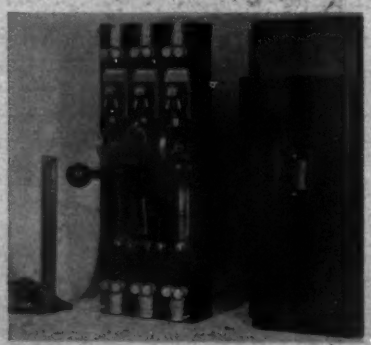

FIG. 12
Westinghouse "De-ion" air circuit breaker, 600 ampere size.

De-Ion Circuit Breaker

The De-ion air circuit breaker using the principle of the cold cathode arc and multiple gap extinguishing structure was recently introduced for 15,000 volt service. The design has recently been extended up to 22,000 volts and down to 2300 volts. These air circuit breakers greatly reduce the maintenance and add to the safety of operation of the breakers through the complete elimination of oil. The principle has also been extended to the smaller breakers for 125 to 600 volts service. These units are very compact requiring less mounting space than the corresponding carbon breaker. The low voltage units are mounted in moulded bases of Micarta and are completely enclosed making an extremely safe unit to operate. The low voltage breakers are available in capacities 50 to 225 amperes for 250 and 600 volts a-c. and 125 and 250 volts d-c. They are assembled with 1, 2, 3 or 4 pole combinations. They serve to replace fused knife switches, small air circuit breakers, or similar devices and are suitable for various types of switchboard mounting. The interrupting capacity of the De-ion breaker is not variable with voltage as is the case in oil breakers. The 50 to 225 ampere AB De-ion breakers have a rupturing capacity of 10,000 amperes at rated voltage.

Delaware Valley TAPPI To Meet

The next meeting of the Delaware Valley Section of the Technical Association of the Pulp and Paper Industry will be held at the Engineers Club, Spruce street, Philadelphia, on May 25 at 6:30 p. m.

The speaker will be Dr. R. E. Rose, Director of the Technical Laboratories, Organic Products Department (Dyestuffs) of E. I. du Pont de Nemours & Company, Wilmington, Delaware. Dr. Rose is the President of the American Textile Colorists and Chemists Association.

The speaker will talk on recent technological developments and theories regarding cellulose in the motion picture film, transparent wrapping, rayon and textile industries.

B. C. Pulp & Paper Bondholders to Meet

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., May 14, 1934—The British Columbia Pulp and Paper Company has notified holders of its 7 per cent general mortgage sinking fund bonds that a meeting will be held in Montreal on May 22 for the purpose of voting for or against a resolution providing for postponement of interest between May, 1932, and November 1, 1934, to May 1, 1936. The company intends to offer interest of 7 per cent on the unpaid interest, and will reserve the right to make pre-payment from time to time on thirty days' notice. In addition, the bond holders will consider the advisability of cancelling the sinking fund payments which fall due in 1935, 1936, and 1937.

Estate of Late James W. Toole

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., May 12, 1934.—The inventory of the estate of the late James W. Toole, former general superintendent of the American Writing Paper Company, filed the past week showed an estate of $146,486. Henry D. Vining and Percy D'Orr, of Springfield, and George M. Forrest, of Longmeadow, were the appraisers. Large items in the personal estate included $28,486 in the preferred shares of the American Brake Shoe and Foundry Company, $52,455 in the common stock of the same company, and $27,588 in shares in the American Telephone and Telegraph Company.

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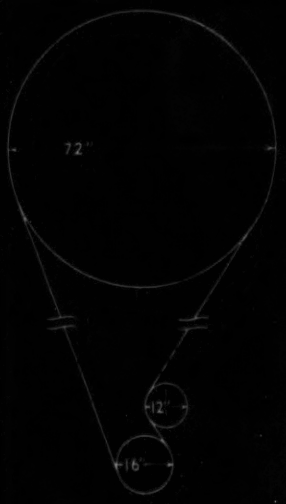

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COMING EVENTS

American Pulp and Paper Mill Superintendents' Association, annual convention. Headquarters Poland Spring House, South Poland, Me., June 20-22, 1934.

Technical Association of the Pulp and Paper Industry, Fall meeting. Headquarters Multnomah Hotel, Portland, Ore., September 10-13, 1934.

RAISING PINE TREES IN THE SOUTH FOR THE MANUFACTURE OF PAPER

On a tract of 10,000 acres near Pregnall, S. C., it is being demonstrated by the Southern Railway that large or small areas of timber land stocked with quick growing pines can be so managed as to provide a perpetual source of income by using them for pulpwood for the manufacture of paper under the process developed by Dr. Charles H. Herty.

The most convincing demonstration on this tract it is stated is in a planting of slash pine. Recent measurements of more than 2,000 of these trees show that in only eight years from the seed, more than 60 per cent of them range in diameter at brest height from 3.5 to 7 inches, and they are growing at the rate of .7 inch per year. At this rate, when they are 17 years old from the seed they will range from 9 to 12.5 inches, amply large for cutting pulpwood. But, these trees will all be large enough to work for naval stores, and as they will not begin to form heartwood until they are about 25 years old, they may be profitably devoted to the production of turpentine and rosin for four or five years, after which they may all be cut for pulpwood, or some of the larger trees may be cut for lumber immediately or allowed to stand for further growth.

The quick-growing pines are not the only Southern woods adapted to the making of paper. They are particularly well adapted to the making of news print, but a great variety of Southern trees, including the long leaf, short leaf, loblolly, slash, scrub and spruce pines, yellow poular, black gum, basswood and chestnut are adapted to the making of different kinds of paper and paperboards.

In discussing the experiment at Pregnall, J. C. Williams, manager of the Southern Railway Development service in Washington said:

"It is uneconomic for an individual to buy an article that he can produce for himself at lower cost, especially if he can do so without depleting his capital assets. For a nation to import goods that can be made cheaper at home and the production of which can be carried on in perpetuity with a constantly-maintained supply of raw material is even more uneconomic for, not only do the users of these goods have to pay more for them, but the money is sent abroad instead of being used at home to give additional employment and, directly or indirectly stimulate business in all lines.

"An instance of this uneconomic practice is the importation of newsprint paper and pulpwood from foreign countries when news print paper of the highest quality can be made at substantially less cost from the pine trees of our Southern states.

"Before Dr. Charles H. Herty published the fact that, until they begin to form heart-wood when twenty to twenty-five years old, Southern pines contain no more resin than Northern spruce, it had been supposed that their resinous content was so great as to preclude their use for news print paper. Since that time, Dr. Herty, in his experimental plant at Savannah, and at least two commercial paper mills in the South have demonstrated that news print paper of excellent quality can successfully and economically be made from Southern pines.

"Spruce is slow-growing tree requiring 50 to 60 years to reach pulpwood size. Southern pines, including slash, long leaf, loblolly and short leaf require only from twelve to twenty years. Under favorable conditions slash and loblolly have grown to pulp-wood size in eight years from the seed.

"If there remain any doubt as to the commercial practicability of supplying the newspaper requirements of the United States from Southern forests and doubt was dispelled by a paper read before the annual meeting of the Canadian Pulp and Paper Association in January of this year by A. A. MacDiarmid, chief engineer of Price Brothers & Co., Ltd., makers of news print paper at Kenogami, Quebec. Mr. MacDiarmid reviewed Dr. Herty's work summarized the advantages of the South and gave the Canadian paper makers the unwelcome information that an advantageously located mill in the Southeastern section of the United States could put news print paper in competitive markets such as Boston, New York, Philadelphia and Washington at a total cost, including freight, of from $8 to $9 per ton less than the lowest cost Canadian mills.

"The stage is set for the development of a great news print industry that will give employment to many thousands, distribute millions of dollars annually in Southern communities and save millions to the newspaper publishers of the nation."

Work of the Import Committee

The Import Committee has cooperated in taking steps to secure the United States paper mills a preferential consideration such as now exists with Cuba in the preparation of a new commercial treaty now being drafted. This action was taken in behalf of several groups in the paper industry, including paperboard, tissue paper, writing paper, kraft wrapping and other grades for which the United States has a good market in Cuba. The American mills sell more paper per capita of population in Cuba than in any other country to which they export their products.

An effort to import from Canada paper weighing 38 pounds and used for printing a rotographic supplement for a newspaper has been checked by the imposition of duty on the paper. It was entered as standard newsprint, but was found to be a dutiable paper. The paper was not imported by a newspaper, but for a job printing house which produced the finished supplement for the newspaper.

Importers of colored newsprint at Los Angeles have abandoned six protests which had been carried to Customs Court against a classification of colored paper in sheets as dutiable printing paper. The importers had claimed that the paper was duty free as standard newsprint. The papers in question were in sheets of various sizes, and included poster papers as well as colored newsprint in sheets. The colors involved were canary (both canary news and poster), mandarin, red, green, pink and orange.

At the same time Los Angeles importers of white newsprint abandoned their protests against the classification for duty of such paper in sheets 6 x 9 and 9 x 12 inches, three shipments of such paper being involved. This is paper such as is being bought abroad for school uses by the California public schools.

The United States Customs Court has decided that three importations of colored paper in sheets at Los Angeles are dutiable as printing paper, and not duty free as standard newsprint as claimed by the importer. Some of the paper was canary news, while the rest of the shipments were in pink, green and other colors.

Investigation is being made of imports of various types of board for the shoe industry, which are coming into this country at prices which the domestic producers can not meet and still comply with the wage and hour requirements of the Recovery Act. These boards include kraft innersoling, and shoe counter boards in various grades.

Powell River Co. Increases Wages

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., May 12, 1934.—Effective May 1, wages to employees of the Powell River Company have been increased from 12½ per cent on the lower rates to 10 per cent on the higher scales. Announcement was made recently by A. E. McMaster, vice president and general manager of the company, in a statement to employees of the company at Powell River. It was accepted by the employees as an indication that a more optimistic outlook on the newsprint industry may be reasonably justified.

The Powell River Company was one of the last of the major concerns in British Columbia to reduce wages. Its initial cut was not made until January, 1932, and the company then pledged itself to restore any necessary wage cuts as soon as conditions warranted.

Company officials point out that in order to maintain the big plant at full capacity during 1933 it had to accept a large number of low price tonnage orders. It was hoped that 1934 would show a price improvement, but this has not yet materialized, prices having actually dropped below the 1933 figure, and no adjustment is now expected this year.

"We are convinced, however," stated Mr. McMaster, "that the gradual improvement in world conditions which is now manifested, will reflect itself in newsprint prices next year. We fully appreciate the excellent effort made, and the co-operation extended by all the officers and employees of our company over the trying period of the last two years, and consequently the directors at their recent annual meeting decided to immediately put into effect an increase in wage rates and salaries."

The Powell River Co.'s plant is now turning out 640 tons of newsprint daily, and is the largest newsprint producer on the coast, and one of the largest individual mills in Canada. Seven newsprint machines are operated and approximately 1400 men employed. The population of the company town of Powell River, B. C., is 5000, all of whom are directly dependent on continued operations of the paper mill.

Dorr-Oliver Corp. Being Dissolved

After affiliation for three years, it has been agreed to dissolve the Dorr-Oliver Corporation, and that The Dorr Company, Inc., and Oliver United Filters, Inc., thereafter will operate independently of each other.

Oliver United will, however, undertake the further adaptation and marketing of the Dorrco Filter in the United States and in certain other countries; and Oliver United products, including filters, will be handled in European territories by the foreign representatives of the Dorr Company.

Both Dorr and Oliver United will continue to be represented in South Africa by E. L. Bateman, Pty. Ltd., Johannesburg; in Australia by Crossle & Duff, Pty. Ltd., Melbourne; and in Japan by Andrews & George Company, Inc., Tokyo, acting independently for each company.

The separation of the two companies has been brought about on an entirely friendly basis, and the many personal friendships which have been formed among members of the two organizations during the past three years will be continued.

Gulf States Paper Corp. Resumes

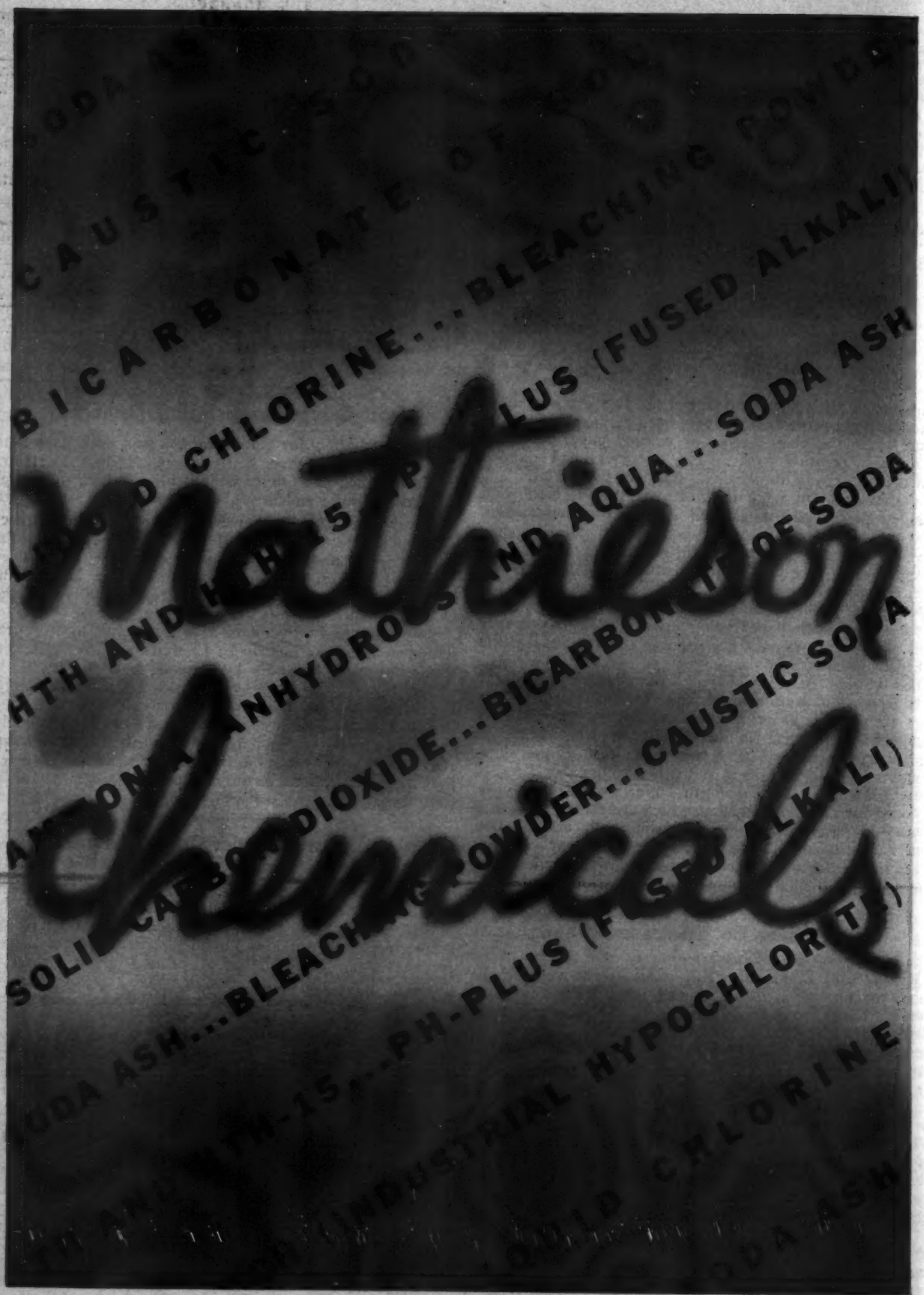
[FROM OUR REGULAR CORRESPONDENT]

TUSCALOOSA, Ala., May 12, 1934.—Full time operations have been resumed by the Gulf States Paper Corporation mill in the pulp and paper departments, according to announcement by Willis E. Penfield, production manager for the firm. The mill had suspended operations for a number of days due to a coal shortage developing from strikes in the Jefferson County and Walker County coal fields.

The bag factory resumed work early on a part-time basis and it will continue on part-time until the paper-making department can furnish enough paper for full-time operation. When the mill is operating on a full-time 24-hour basis it employs more than 700 workmen.

Clifton Mills Damaged by Fire

CLIFTON, N. J., May 14, 1934—Fire swept the yards of the Clifton Paper Board Company early on Wednesday of last week, causing damage estimated by Fire Chief John Zanet at $100,000. Many tons of blazing paper made a roaring inferno of the yard and threatened the company's buildings before the flames were brought under control.



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Drying

Drying Boards Made on the Wet Machine. F. Venneman. Mon. Papeterie Belge 13:679-682 (Nov., 1933). —A brief general discussion.—A.P.-C.

Drying Paper Machine Felts. Reinhard Schulze. Brit. pat. 393,417 (June 8, 1933).—The felt is dried by forcing hot air, *e.g.*, at 120° C., through it as it passes over a slotted or perforated cylinder. An apparatus is described.—A. P.-C.

New Method for Determining the Moisture Content of Paper As It Leaves the Paper Machine Driers. René Leonhardt. Mon. Papeterie Belge 13: 675-677 (Nov. 1933).—A brief description of the "siccometer," constructed by Siemens & Halske, and of its merits. The instrument determines the moisture content by measuring the dielectric constant of the sheet which passes continuously through a specially designed condenser cell, which consists essentially in a single plate over which the sheet of paper is passed.—A. P.-C.

Treatment of Paper Making Felts. Deutschen Bekleidungsindutrie G.m.b.H. Fr. pat. 747,916 (June 26, 1933).—Paper making felts are treated with agents which render them resistant to attack by bacteria and by acids. The agents may be applied to the felts either before use, or continuously during the operation of the paper machine. —A. P.-C.

Drier Felt for Paper Or Board Machines. E. von Osten. Belg. pat. 394,945 (April 29, 1933).—The felt consists of a textile fabrics impregnated with a rubber solution that coats the fibers without filling up the pores of the fabric.—A. P.-C.

Dryer Section for Paper and De-Watering Machines. Netschkauer Maschinen Fabrik, Netschkau. Ger. pat. 579,525 (Feb. 25, 1932).—The invention concerns itself with an arrangement for providing the drier section with hot air and the removal of the water vapors formed in the process.—J. F. O.

Process and Arrangement for the Drying of Paper on Drying Cylinders. A. Bol. Karlstads Mek. Verkstad, Karlstad. Nor. pat. 52,367 (Jan. 30, 1932).—A pipe is introduced into the drier cylinder in such a way that the steam is directed in a fine spray against that part of the cylinder where the paper comes in contact with the outer part.—J. F. O.

Process for the Drying of Materials in Chambers with the Recovery of the Volatile Constituents, Especially Webs of Fiberous Material Consisting of Several Layers Which Have Been Drenched or Coated with a Solution of Artificial Rosin in Alcohol. Jaroslaws Erste Glimmerwaren Fabrik, Berlin. Ger. pat. 580,705 (Sept. 20, 1929).—J. F. O.

Felt for Paper Machines. Aktiegesellschaft Fezfabsellschaft Fezfabriken, Vienna. Aust. pat. 132,975 (July 15, 1931).—J. F. O.

Seam for a Dryer Felt for Paper Machines. Aktiengesellschaft Fezfabriken, Vienna. Aust. pat. 134,120 (July 15, 1931).—J. F. O.

Arrangement for the Drying of Board or Other Similar Material on a Flat Surface. A. Bol. Svenska Flaktfabriken, Stockholm. Swed. pat. 77,381 (March 17, 1928).—The system consists of a conveyor for the board, a drying canal and blowers for the warm air, all arranged in a special manner.—J. F. O.

Dryer Felt for Board and Paper Machines. Eduard Asten, Hauset, Belgium. Ger. pat. 582,911 (May 1, 1932). —The felt consists of a textile weave that is drenched with a solution of rubber in such a manner that all or a part of the fiber and thread pores, but not the pores of the weave, are closed. Such a felt dries quicker and has a longer life.—J. F. O.

Analysis and Testing

Present Status of Determining the Strength of Chemical Wood Pulps. Société Spiro. Chemie & Industrie Special No.: 1101-1106 (June, 1933).—A description of the present standard Swedish, American and German methods for the preparation of test sheets for the strength-testing of chemical wood pulps.—A. P.-C.

The Place of Pulp Color Measurements in Paper Making—Present and Future. Lester C. Lewis. Paper Trade J. 97, No. 23: 35-39 (Dec. 7, 1933).—Difficulties with color measurements arise from involving too many variables. Improvements effected during the past few years in methods of measuring reflectance make it possible to substitute this determination for the more complex and less certain "color" measurement. Its field of usefulness in the pulp and paper industry is briefly discussed.—A. P.-C.

Methods of Hydrating Pulp for Strength Testing. Howard W. Morgan. Paper Trade J. 97, No. 24: 35-38 (Dec. 14, 1933).—A review of the present status of the use of the experimental beater and porcelain pebble mill for preparing pulps samples for sheet making and subsequent testing.—A. P.-C

Analysis of Salt Cake. Anon. Paper Trade J. 97, No. 18: 33-35 (Nov. 2, 1933).—A description of the tentative standard TAPPI methods.—A. P.-C.

Analysis of Water. Anon. Paper Trade J. 97, No. 18: 36-39 (Nov. 2, 1933).—A description of the tentative standard TAPPI methods.—A. P.-C.

Determination of Gelatin in Paper. V. Gruenman. Papier 36: 729-737, 821-827 (Aug. and Sept., 1933).—A critical review of the principal methods for the qualitative detection and quantitative determination of gelatin in paper.—A. P.-C.

Reproductions of Photomicrographs of Paper Cross-Sections. Walter E. Rogers. Paper Ind. 15:450-451 (Nov., 1933).—A series of 11 microphotographs of various grades of paper are given, and their chief characteristics are pointed out.—A. P.-C.

Paper Specialties

Waterproof Cardboard. Herbert Roll. Brit. pat. 391,349 (April 27, 1933).—A film of nitric acid or acetic acid esters or ethers of cellulose is applied as a solution to one or both sides of a porous cardboard by sprays, rolls, etc., preferably after printing.—A. P.-C.

Impregnating Fiberboard with Substances Such As Fireproofing Materials. Alexander Winogradow. U. S. pat. 1,917,176 (July 4, 1933).—The board is completely impregnated with a solution of a substance such as triphenyl phosphate in a solvent such as alcohol; a substantial portion of the impregnating solution is squeezed out of the material; the latter is then treated with another liquid such as water which precipitates the dissolved impregnating substance throughout the board, and remaining liquids are removed by squeezing and drying.—A. P.-C.

Coated Papers. Frank W. Bailey, Sydney F. W. Crudall and Howard Spence, assignors to Peter Spence and Sons, Ltd. U. S. pat. 1,920,340 (Aug. 1, 1933).—The surface of the paper is treated with a coating composition comprising a pigment consisting of china clay and anhydrous calcium sulphate.—A P.-C.

Stencil-Sheet Coating Composition. Hans Simon, assignor to Günther Wagner. U. S. pat. 1,915,904 (June 27, 1933).—One hundred and thirty parts of water, 40 of a sulphonated oil, 20 of tritolyl phosphate, 10 of ultramarine blue, 10 of oleic alcohol, 8 of gelatin, 6 of beechwood flour, 5 of myricyl alcohol, 3 of glycerol and 0.5 of dinitrotoluene are used together.—A. P.-C.

Stencil-Sheet Coating Composition. Kenneth W. Carr, assigner to Ditto, Inc. U. S. pat. 1,916,203 (July 4, 1933).—Two parts of aluminum stearate, 16 of 45 per cent solution of phenol-formaldehyde resin, 14 of chlorinated naphthalene and 13 of corn oil are used together.—A. P.-C.

Coating Compositions. Courtaulds, Ltd., and Frank Shedden. Brit. pat. 391,299 (March 19, 1932).—Coating compositions for waterproofing sheets of cellulose material, such as paper, etc., comprise nitrocellulose, dimethyl phthalate, a wax such as paraffin or ceresin, and a solvent such as butyl acetate. Plasticizers such as triphenyl phosphate may be added.—A. P.-C.

Stencil-Sheet Coating Composition. Shinjiro Horii. Brit. pat. 391,016 (April 20, 1933).—A suitable thin tissue paper is coated with a mixture of mineral waxes and an esterification product of bleached montan wax and polyhydric alcohols.—A. P.-C.

Printing and Waxing Paper. Edward C. Francoise. Brit. pat. 380,244 (Sept. 15, 1932).—Paper is printed on one side, a thin film of liquid wax is applied to the other side, and after the ink is dry the paper is passed through a bath of hot liquid wax. An apparatus is described.—A. P.-C.

Production of Glassine or Imitation Parchment Paper. Geo. L. Bidwell, assignor to Riegel Paper Corp. U. S. pat. 1,914,798 (June 20, 1933).—An aqueous solution of cerelose is used for treating paper to produce a glassine or imitation parchment paper; glycerin, sodium metasilicate, etc., also may be used.—A. P.-C.

Glassine Paper. George A. Richter, assignor to Brown Co. U. S. pat. 1,921,540 (Aug. 8, 1933).—Raw fibrous material such as manila or sisal is pulped in a cooking liquor containing sodium sulphite as the essential fiber-liberating agent; the resulting pulp is beaten to the hydrated condition requisite for making translucent paper, and paper is formed from the beaten pulp.—A. P.-C.

Impregnating Paper or Felt with Liquids Such As Hot Tar or Asphalt. Joseph Zavertnik and Alexander A. MacCubbin, assignors to The Barrett Co. U. S. pat. 1,920,541 (Aug. 1, 1933).—The stock is impregnated by passing around a suction cylinder partially immersed in a bath of molten tar or asphalt; before reaching the suction cylinder, the side of the stock that is to come in contact with the cylinder is sprayed in order to render it more pliable so that it will fit more closely to the surface of the roll.—A. P.-C.

Roofing Material. Dozier Finley, assignor to The Paraffine Companies. U. S. pat. 1,920,931 (Aug. 1, 1933).—A moistureproof layer such as asphalted felt roofing is provided with a variegated surface layer of granules formed of one metal partially coated with a metal of a different color.—A. P.-C.

Wall Board. John A. Wiener and John B. Harmon. Can. pats. 332,563 and 332,564 (May 23, 1933).—*No. 332,563*—Fireproof wall board is manufactured by beating 500 parts of shredded fiber and 250 parts of finely ground mica with an aqueous solution including 25 parts zinc chloride, 25 parts ammonium sulphate and 25 parts of borax, and forming a sheet from such stock. *No. 332,564*—Fibrous wall board having finely ground mica interspersed among the fibers is fireproofed by impregnation with a solution comprising ammonium phosphate, boric acid, magnesium sulphate and water.—A. P.-C.

Mechanical Strength. H. H. Nelson and G. Becker. Belg. pat. 395,388 (April 29, 1933).—Pulp fibers are impregnated with a solution of cellulose thiosulfocarbonate, coagulation of which is subsequently produced by an acid coagulant.—A. P.-C.

Moistureproof Paper. Eugen Sonnenfeld. Brit. pat. 392,023 (May 11, 1933).—Moistureproof opaque or transparent paper is made by incorporating with the pulp at any stage of manufacture or adding to the paper web in the absence of volatile solvents a plastic mass made from cellulose esters and (or) ethers together with plasticizers and water-repellent substances, *e.g.*, rubber, oils, fats, waxes, etc., the mass being made by gelatinization and mechanical kneading and the paper being preferably hot-calendered.—A. P.-C.

Waterproofing Paper. La Cellophane, Soc. Anon. Fr. pat. 748,552 (July 6, 1933).—Paper and other materials are coated with a material containing a substance of the nature of rubber and an animal, mineral or vegetable wax or paraffin. Other substances may be added to increase the hardness or give a particular aspect.—A. P.-C.

Processing Variables in Evaluating Pulps By the Pebble and Rubber-Covered Ball Methods*

F. A. Simmonds[1] and P. K. Baird[2]

Abstract

Data from several miscellaneous experiments are presented here on some of the variables involved in processing pulp in a pebble mill, a resilient-surfaced (rubber) ball mill, and, to a very limited extent, a beater. The objectives of the original experiments were limited to immediate informational requirements, consequently the data presented herein do not represent a complete study of the variables of any of the processing units described but have been assembled in the present form for interpretation as to their possible significance in pulp processing for its evaluation.

The variables of the pebble mill represented are jar diameter and the attendant volume, rotational speed of the mill, consistence, weight of pulp, and pulp-stone weight ratio. Data are also included relative to the effect of rapidly stirring the stuff prior to the formation of test sheets, and on the effect of milling continuously and batchwise. In the resilient-surfaced ball mill, the consistence, the total weight of the balls, and the diameter of the balls used were varied.

One pulp that was processed in both pebble and ball mill was also processed in a beater in order to afford a comparison of the effects of the three types of mechanical processing units.

Experimental Part

Materials

The materials consisted of two kraft pulps designated as Nos. 1 and 2, and six sulphite pulps similarly numbered from 1 to 6 inclusive. The kraft pulp No. 2 and the sulphite pulp No. 3 were below the average strength as illustrated by the strength values recorded in the tables. Sulphite pulps Nos. 1, 2, and 3 were "quick-cook" pulps, whereas Nos. 4 and 6 were, respectively, unbleachable and bleachable mitscherlich pulps.

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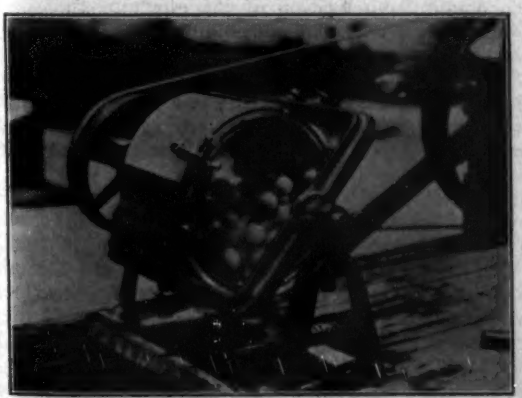


Fig. 1.

Rubber-lined ball mill.

Fig. 2.

Propeller-type stirrer.

Apparatus

The apparatus comprised a pebble mill; a rubber-lined, glass-ended mill employing lead balls (herein termed a "ball mill") covered with rubber; a "20-pound" beater; regular and projection microscopes with camera, and the usual pulp and paper testing apparatus.

The internal depth and diameter of the jars of the pebble mill were approximately 13 and 10.5 inches, respectively.

The rubber-lined ball mill is illustrated in Fig. 1. Its internal depth and diameter were approximately 11 and 14 inches, respectively. A portion of the balls used were 1-¾ inches in diameter and the remainder, 1-½ inches. The use of this mill was made available through the courtesy of the Rubber Surfacers, Incorporated, of New York City.

The beater, as stated, had a capacity of 20 pounds of pulp. The roll of this beater was 18 inches in diameter and 14 inches across the face; had 30 bronze bars ⅛-inch wide, spaced 1-½ inches apart; weighed about 400 pounds; and rotated at a speed of 350 r.p.m. Thus, the peripheral speed was 1,650 f.p.m. The roll was raised and lowered approximately 0.0013 inch by each turn of a hand wheel. The bed plate had 10 bronze bars each 3/16-inch wide spaced ¼-inch apart.

Preparation of the Test Sheets

Unless otherwise stated, the pulps and stuffs were stirred for 2 minutes by means of a propeller-type stirrer (Fig. 2) before the measured portions were poured into

TABLE I
DIMENSION OF JAR LINERS

Jar liner No.	Internal length Inches	Average internal diameter Inches	Volume Cubic inches
1 Old	13.12	10.36	1105
2 Old	13.12	10.52	1135
3 New	13.75	9.77	1028
4 New	13.62	9.86	1035
5 New [a]	13.70	9.70	1010
6 New [a]	13.70	9.64	1000

[a] Replaced old liners Nos. 1 and 2.

the deckle box of the sheet machine. The purpose of this agitation was to disintegrate the clumps of fibers that form during pebble milling. An official TAPPI agitator (Fig. 3) was used to agitate the fiber suspension in the deckle box by lowering and raising it twice just before the water was drained away from the fiber. The formed test sheets were couched on photographers' blotting paper, pressed at 100 pounds per square inch, and air-dried between the blotters. After being air-dried, the sheets were conditioned in a relative humidity of 65 per cent and at a temperature of 72 deg. F. for 12 to 16 hours and trimmed to a size of 5 by 7 inches before being tested. A ream size of 24 by 36 — 500 (basis weight) was used for determining the sheet weights.

Pebble Mill

A new pebble mill had recently been installed at which time new jars were also to be put in the old mill. Since the internal dimensions of the old and new jars were different, it was necessary to determine the comparative processing effects for this change. The old jars were numbered 1 and 2; the new jars from 3 to 6. Nos. 5 and 6 replaced 1 and 2. The dimensions of these jars are recorded in Table I. In this comparison the milling procedure used was the Forest Products Laboratory Method No. 101 in which batches of the equivalent of 90 grams

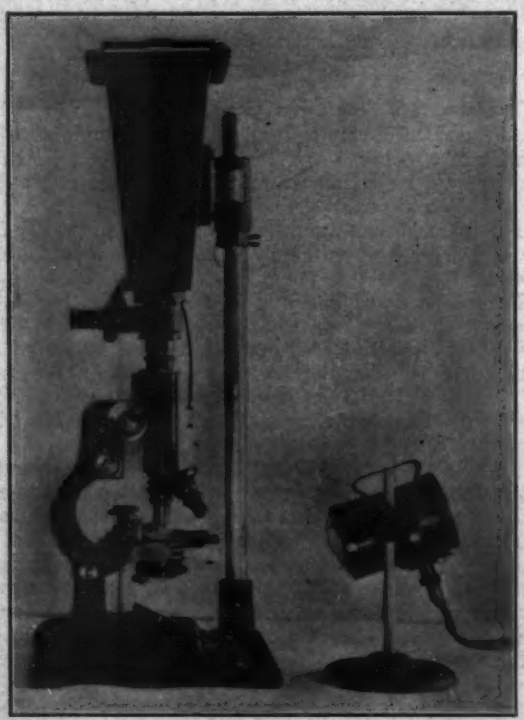


Fig. 4.
Apparatus used for taking photomicrographs.

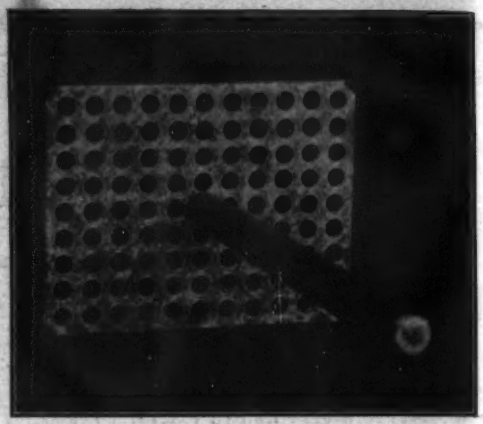


Fig. 3.
Official TAPPI agitator.

of oven-dry fiber, 2 liters of water, and 4.54 kg. of pebbles, 1,780 cc. in volume and about 125 in number are placed in separate jars and milled for a specified time, the unit being 22 minutes, at a rotational speed of 60 r.p.m. The resulting stuffs were made into test sheets. Samples of the kraft pulp No. 1 were milled for both 44 and 132 minutes in jars Nos. 1 and 3, and for both 88 and 176 minutes in jars Nos. 2 and 4. Then samples of the sulphite pulp No. 1 were milled in each jar for 22, 44, 66, 88, 110 and 132 minutes. The bursting strength factors of the test sheets made from the resulting stuffs are recorded in Table II and graphed in Fig. 5.

Following this procedure, the old liners in jars 1 and 2 were replaced by new ones which were numbered 5 and 6, respectively. Samples of the No. 1 kraft pulp were milled in each jar for 44, 88, and 132 minutes followed by a similar treatment of the sulphite pulp for 44, 66, 88, and 110 minutes. One portion of the milled samples of No. 1 kraft pulp was stirred 2 minutes by the stirrer before forming the test sheets in order to determine the effect on the clumps of fibers formed during milling. These data are recorded in Table III and partially graphed in Fig. 6.

To determine the effect of stirring the milled pulp for various lengths of time before forming the test sheets, portions of a sample of the No. 1 sulphite pulp previously milled in jar No. 4 for 88 minutes were agitated in the stirrer. These results are presented in Table IV.

To obtain an indication of the effect of the speed of rotation on the strength development, the kraft and sulphite pulps Nos. 1 and 2, respectively, were processed at a mill speed of 52 revolutions per minute in jars Nos. 3 and 4, in comparison with the standard mill speed of 62 revolutions per minute as required in Forest Products Laboratory Method No. 101. The results are recorded in Table V.

The effects of the different jar diameters on the development of bursting strength are summarized in Table VI.

To observe the processing effects of certain combinations of the components of the charge when the milling was done both batchwise and continuously, the runs recorded in Table VII were made. The continuous method of milling differed from the batch in that a single, relatively large portion of a pulp was charged to the mill with pebbles and water. Then at regular intervals, samples of a given weight were removed for the preparation of test sheets. The resulting sheets were tested for the bursting strength. After the effect of these combinations

TABLE II
THE BURSTING STRENGTH FACTORS EFFECTED BY THE OLD AND NEW LINERS AT A MILL SPEED OF 60 R.P.M.

			Sampling Interval, (minutes)						
	Liner		22	44	66	88	110	132	176
			Revolutions						
			1320	2640	3960	5820	6600	7920	10,560
Kind of pulp	No.	Age	Points per pound per ream, 24 x 36—500						
Kraft, No. 1.....	1	Old	...	0.73	...	...	...	1.15	...
Kraft, No. 1.....	2	Old	...	...	...	1.13	...	...	1.07
Kraft, No. 1.....	3	New	...	0.75	...	...	...	1.05	...
Kraft, No. 1.....	4	New	...	...	...	1.10	...	...	0.97
Sulphite, No. 1..	1	Old	0.38	0.60	0.70	0.75	0.74	0.74	...
Sulphite, No. 1..	2	Old	.39	.50	.72	.71	.74	.67	...
Sulphite, No. 1..	3	New	.33	.56	.67	.69	.68	.63	...
Sulphite, No. 1..	4	New	.31	.55	.67	.68	.69	.60	...

had been observed, a pulp-pebble-water ratio of 1:54:39 was selected for the continuous method in order to compare further the respective processing effects of the two methods. The results of these two tests are summarized in Table VIII.

Rubber-covered Ball Mill

Twenty-three runs, as recorded in Table IX, were made with this processing unit, utilizing the continuous method. The stuffs resulting from the processing of sulphite pulps Nos. 5 and 6 were tested for bursting and tearing strengths except those from runs V, W, and X upon which the Green values freeness were also determined. Sulphite pulp No. 5 was run in the pebble mill according to the continuous method, the results to be used as a basis for comparison.

Beater

Sulphite pulp No. 5 was beaten for 4-¾ hours in the 20-pound beater. The roll settings used during the beating and the bursting and tearing strength of stuffs corresponding to these settings are given in Table X.

Microscopical Methods

The following procedure was used in mounting the fibrous material on slides for determining the length of fibers and parts of fibers and the preparation of photomicrographs. An area of approximately one-half square inch of a pulp test sheet represented by small pieces torn from various parts of the sheet were boiled in 50 cc. of distilled water for 2 to 3 minutes. This treatment rendered the sample easily disintegrated by shaking in a test tube with the hot water and two small glass beads. After the fibers were separated the suspension was poured into a glass cylinder about 35 mm. in diameter and diluted to 200 cc. A glass tube 4 mm. in diameter was used to withdraw a sample of the diluted suspension immediately after a thorough agitation. The suspension was allowed to rise in the sampling tube to a height of about 70 mm. and this sample transferred to a slide 50 by 75 mm. in size. After the water had been evaporated by placing the slide on an electric hot-plate, approximately one-half of the fibers on the slide were removed and the remaining half redistributed over the slide by means of water and the water again evaporated. Following the second evaporation the fibers were stained with a 0.5 per cent aqueous solution of benzopurpurin.

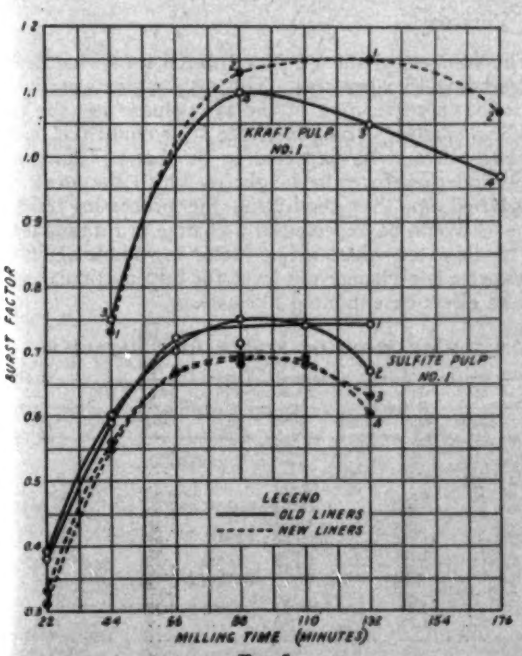


FIG. 5.
Comparison of the effects of new and old liners on busting strength.

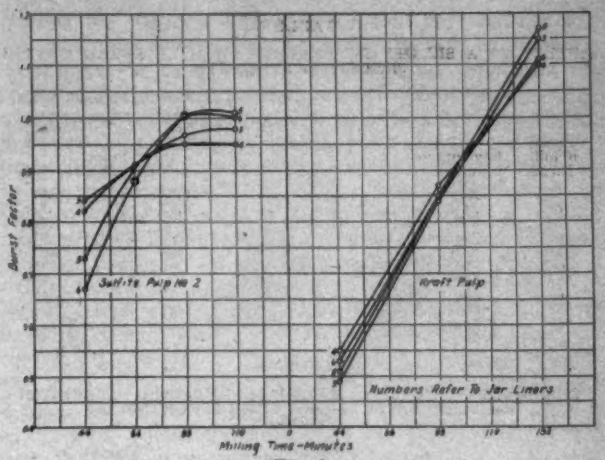


FIG. 6.
Comparison of the effects of new liners.

The apparatus used for taking the photomicrographs is illustrated by Fig. 4. A magnification of 105 diameters was selected as being most generally useful. The details of exposure depend, of course, on the kind of plate or film used, the intensity of light, the density of the slide, the magnification selected, and the setting of the microscope condenser.

The fiber measurements were made by the aid of a projection microscope using magnifications of 32, 46, and 47.5. The projected images of the fibrous particles were

TABLE III
THE MILLING AND FORMATION EFFECTS OF THE NEW LINERS, AND STIRRED AND UNSTIRRED STUFF, RESPECTIVELY

		Sampling Interval, (Minutes)							
		44	88	133	44	66	88	110	132
		Revolutions							
		2640	5280	7920	2640	3960	5280	6600	7920
		Stuff stirred 1 minute			Stuff unstirred				
Kind of pulp	Liner No.	Bursting strength factors in points per pound per ream, 24 x 36—500							
Kraft, No. 1....	3	0.54	0.97	1.18	0.49	...	0.84	...	1.15
Kraft, No. 1....	4	.56	.94	1.16	.55	...	.87	...	1.11
Kraft, No. 1....	5	.53	.84	1.09	.51	...	.85	...	1.17
Kraft, No. 1....	6	.52	.87	1.17	.53	...	.85	...	1.10
Sulphite, No. 2..	3	...	...	...	.84	0.88	.97	0.98	...
Sulphite, No. 2..	4	...	...	...	.82	.91	.95	.95	...
Sulphite, No. 2..	5	...	...	...	.73	.91	1.04	1.09	...
Sulphite, No. 2..	6	...	...	...	.67	.88	1.05	1.01	...

TABLE IV
EFFECT OF THE VARIABLE STIRRING OF STUFF ON THE BURSTING STRENGTH FACTOR OF TEST SHEETS

Stirring time (minutes).....	0	1	5	10	15	20	25
Bursting strength factor (points per pound per ream)	0.66	0.71	0.73	0.76	0.80	0.75	0.79

TABLE V

EFFECT OF A SLIGHT DIFFERENCE IN MILL SPEED ON THE BURSTING STRENGTH

Speed of mill, R.p.m.	Revolutions, Number	Bursting strength factor: Kraft pulp No. 1	Bursting strength factor: Sulphite pulp No. 2
		Points per ream, 24 x 36—500	
52	2288	0.54	0.66
60	2640	.52	.82
52	3432	...	.88
60	3960	...	.91
52	4576	.82	1.01
60	5280	.86	.95
52	5720	...	.97
60	6600	...	.95
52	6864	1.09	...
60	7920	1.13	...

TABLE VI

COMPARISON OF THE MAXIMUM BURSTING STRENGTH FACTORS EFFECTED BY THE DIFFERENT JAR VOLUMES

Liner No.	Volume inches	Maximum bursting strength factor: No. 1 kraft	Maximum bursting strength factor: No. 1 sulphite	Maximum bursting strength factor: No. 2 sulphite	Time at which maximum occurred: No. 1 kraft	Time at which maximum occurred: No. 1 sulphite	Time at which maximum occurred: No. 2 sulphite
		Points per pound per ream			Minutes		
6	1,000	1.10	...	1.05	132	...	88
5	1,010	1.17	...	1.09	132	...	110
3	1,028	1.15	0.69	0.98	132	88	110
4	1,035	1.11	.69	.95	132	110	110
1	1,105	...	.75	...	...	88	...
2	1,135	...	.74	...	...	110	...

measured with a millimeter scale, 100 of such measurements being made on each sample.

Discussion of Results

Pebble Mill—Old and New Liners

In the comparison of the processing effects using old and new liners it was observed that the average volume of the new liners was 8.6 per cent less than that of the old.

The bursting strengths of a kraft and a sulphite pulp developed in the old and new jar liners are recorded in Table II. The four liners were numbered 1, 2, 3 and 4 in the order named above.

In the case of the kraft pulp No. 1, the maximum bursting strength was developed in the old liners (Nos. 1 and 2), that is, the liners of the greater diameter and volume. It was 6.5 per cent higher than that developed in the new liners Nos. 3 and 4. However, a milling time 44 minutes longer was required to produce this higher maximum.

In the case of the sulphite pulp No. 1, the maximum bursting strength was developed in the old liners and was 8.7 per cent higher than that developed in the new liners. Unlike the maxima when the kraft pulp was used, these maxima were coincidental in time. These data are graphed in Fig. 5.

New Liners

The bursting strengths effected by processing a sulphite pulp in the four new liners are shown in Table III and Fig. 6. Since the maximum difference in corresponding bursting strengths of the kraft pulp No. 1 was but 0.07 points per pound per ream, the processing effects of the four liners was considered to be the same in this particular instance. However, with the sulphite pulp No. 2, the average bursting strength developed in jars 5 and 6 was 11.4 per cent higher than that developed in jars 3 and 4. Although the agreement between the effects of jars 5 and 6 and between jars 3 and 4 was satisfactory, the type of the average strength curve developed by the first pair was apparently different than that developed by the second pair. This variation will bear further investigation to determine what slight variation in processing conditions can have so much effect.

Effect of Stirring the Stuff

To determine the effect of stirring the stuff before forming the test sheets, portions of an 80-minute stuff from sulphite pulp No. 1 milled in jar No. 4 were stirred for various periods and test sheets made. The bursting strength factors of these are recorded in Table IV. With this particular stuff, a stirring time of 15 minutes produced a sheet of maximum strength. The appearance of the test sheets suggested that the principal result of stirring was a uniform suspension of fibers due to a disintegration of the fiber knots formed during milling. This in turn resulted in sheets of better formation than those made from unstirred stuff.

Mill Speed

The results for the effect of speed variation upon the strength development, shown in Table V, were inconclusive since the kraft pulp No. 1 was 3.7 per cent lower in bursting strength at 52 than at 60 r.p.m. and the sulphite pulp was 6.3 per cent higher. Apparently, rotational speed is not very critical in this range.

Jar Volume

The volumes of the six jars differed somewhat, the total range being 13.5 per cent. The results given in Table VI show that a correlation of the jar volume and the corresponding bursting strength of the stuff could not be made. Its effect would be expected to be that of changing the level, and therefore the height to which the stock would be carried up, thus modifying the processing effect the same as would be expected of a change in rotational speed.

The diameter, which is one factor in volume again would be expected to change the level for any particular volume and its effect be exhibited likewise.

TABLE VII—BURSTING STRENGTHS EFFECTED BY CERTAIN COMBINATIONS OF PEBBLE MILL VARIABLES

Run No.	Mill charge: Pulp, Kg.	Mill charge: Consistence Per cent	Pulp, pebble, water ratio	Sampling interval (minutes): 0	22	25	44	50	66	75	88	100	110	125	132	150	176
				Revolutions: 0	1320	1500	2640	3000	3960	4500	5280	6000	6600	7500	7920	....	....
				Points per pound per ream, 24 x 36—500													
Sulphite pulp No. 3																	
1	0.090	4.30	1:50:22	0.31	0.67	...	0.90	...	1.06	...	1.07	...	1.01	....	...	...	...
2	.200	4.35	1:34:22	.31	.52	...	.66	...	.81	...	.92	...	...	...	...	...	...
3	.180	6.00	1:38:16	.31	...	0.36	...	0.42	...	0.56	...	0.70	...	0.85	...	...	...
4	.180	3.00	1:38:32	.31	...	.56	...	.74	...	.91	...	.98	...	1.07	...	...	...
5	.180	2.00	1:38:49	.31	...	.53	...	.74	...	.91	...	1.01	...	1.08	...	...	...
6	.135	2.50	1:60:39	.31	...	.75	...	1.02	...	1.18	...	1.09	...	.97	...	...	...
7	.135	2.50	1:60:39	.31	...	.74	...	1.02	...	1.16	...	1.06	...	.98	...	...	...
8	.150	2.50	1:54:39	.31	...	.48	...	.86	...	1.06	...	1.10	...	1.06	...	...	...
Sulphite pulp No. 4																	
9	.135	2.50	1:60:39	.40	...	.60	...	1.09	...	1.34	...	1.51	...	1.37	...	...	...
10	.150	2.50	1:54:39	.40	...	.64	...	1.07	...	1.36	...	1.43	...	...	...	...	...
11	.090	4.30	1:50:22	.40	...	...	1.15	...	...	...	1.57	...	...	...	1.34	...	...
Sulphate pulp No. 2																	
12	.090	4.30	1:50:22	.05	...	...	.67	...	...	...	1.02	...	...	...	1.13	...	1.04
13	.150	2.50	1:54:39	.05	...	.36	...	.54	...	.78	...	1.01	...	1.13	...	1.07	...

Combination of Charge Components

The bursting strengths of stuffs produced by various weight combinations of pulp, pebbles, and water in conjunction with both the batch and the continuous methods of pebble milling are recorded in Table VII. Runs 1, 2, 11, and 12 were done batchwise and the others continuously.

Effect of Consistence

The effect of consistence on the rate and magnitude of the development of the bursting strength is indicated by runs 3, 4, and 5, sulphite pulp No. 3. The consistence in run 3 was 6 per cent, and 125 minutes of processing were required to obtain a bursting strength factor of 0.85 points per pound per ream, whereas in run 4 the consistence was but 3 per cent and a bursting strength factor of 1.07 points was obtained in the same time. An additional decrease in the consistence from 3 to 2 per cent did not change the rate or magnitude of the development. It is thought that at the higher consistences the greater amount of fibers between the pebbles lessens the grinding action which is the cause of the more rapid rate of strength development at the lower consistences. Pebbles of high specific gravity to overcome their buoyancy in high consistence pulps would no doubt bring about interpebble grinding and permit the use of higher consistencies.

Effect of Pulp-Pebble Ratio

Runs 5, 6, 7, and 8, sulphite pulp No. 3, indicate that decreasing the amount of pulp with reference to pebbles increases the rate and magnitude of the strength development. Runs 9 and 10, sulphite pulp No. 4, show a higher bursting strength maximum resulting from a decrease of the above ratio.

Overall Batchwise Precision

Runs 6 and 7 using the sulphite pulp No. 3, were made under identical conditions. These data are in excellent agreement and thus show that results obtained with these procedures can be duplicated with a suitable degree of accuracy.

Batch and Continuous Methods

The Forest Products Laboratory rapid control pebble mill test No. 98, a modification of No. 101, consists of milling a pulp continuously with the removal of a small test samples at fixed time intervals. This procedure is simpler than the batch method but unfortunately it results in only slight differences between pulps and develops lower strength values. However, so many advantages are inherent in a continuous method that, in considering means to improve batch method No. 101, a sustained effort was made to find conditions of continuous processing which would produce approximately the same strength values as the batch method. In the tests preliminary to those reported below a sampling interval of 25 minutes (1500 revolutions) was selected since the strength development appeared to be somewhat slower in the continuous milling.

Runs 1 and 4, batch and continuous respectively, Table VII, illustrate that the batch and continuous methods can be made to yield the same value for the maximum bursting strength factor but that the maximum development under the continuous method requires more time. The results from runs 9 to 11 inclusive, sulphite pulp No. 4, confirm these indications to a limited extent. However, in the case of the sulphate (kraft) pulp No. 2, runs 12 and 13, the rate of development is about the same, the continuous being slightly faster.

A further comparison between the batch and continuous methods of pebble milling yielded the results recorded in Table VIII. The charge used in the continuous method consisted of the equivalent of 150 grams of oven-dry pulp, 8,160 grams of pebbles, and 5,850 grams of water, which is a ratio of 1:54:39. The consistence was 2.5 per cent. Two different pressures per square inch on the wet test sheets were used in making these runs; one of 25 pounds for the batch method, and one of 100 pounds for the continuous. The increased pressure would of course cause a corresponding increase in the bursting strength of the test sheets as compared to that of continuously processed stuffs made up with a pressure of 25 pounds per square inch.

It was observed that the common strength properties, with the exception of the tearing strength in all cases and also bursting strength in No. 2316 (Table VIII), were increased in magnitude by the continuous method.

A comparison of the maximum strength values developed in the Douglas fir kraft pulp (digestion No. 2315,

TABLE VIII—STRENGTH DATA FROM PULPS PROCESSED BY BATCH AND CONTINUOUS PEBBLE MILL METHODS

			Sampling intervals (minutes)														
			22	25	44	50	66	75	88	100	110	125	132	150	154	175	176	200
			Revolutions															
Kind of pulp	Strength property	Method	1320	1500	2640	3000	3960	4500	5280	6000	6600	7500	7920	9000	9240	10,500	10,560	12,000
Douglas fir kraft cook 2315	Burst	Batch	....	....	0.55	....	....	....	0.91	....	....	....	1.02	....	....	....	1.05	....
	(Pts./lb./ream)	Cont.	....	....	....	0.81	....	....	....	1.05	....	1.13	....	1.16	....	1.23	....	....
	Tear	Batch	....	....	3.08	....	....	....	3.27	....	....	....	3.35	....	....	....	2.97	....
	(Pts./lb./ream)	Cont.	....	....	....	3.34	....	....	....	3.01	....	2.75	....	2.63	....	2.58	....	....
	Fold	Batch	....	....	37	....	....	....	504	....	....	....	1683	....	....	....	1181	....
	(Double folds)	Cont.	....	....	....	789	....	....	....	1515	....	1404	....	1916	....	2156	....	....
	Tensile	Batch	....	....	2487	....	....	....	4025	....	....	....	4525	....	....	....	4430	....
	(Meters)	Cont.	....	....	....	5222	....	....	....	6410	....	6315	....	6920	....	6940	....	....
Douglas fir kraft cook 2316	Burst	Batch	....	....	0.58	....	....	....	0.52	....	....	....	0.60	....	....	....	....	....
	(Pts./lb./ream)	Cont.	....	....	....	0.44	....	....	....	0.42	....	0.43	....	0.48	....	....	....	....
	Tear	Batch	....	....	2.70	....	....	....	3.58	....	....	....	3.65	....	....	....	3.07	....
	(Pts./lb./ream)	Cont.	....	....	....	3.43	....	....	....	3.62	....	3.53	....	3.43	....	3.03	....	....
	Fold	Batch	....	....	32	....	....	....	276	....	....	....	589	....	....	....	915	....
	(Double folds)	Cont.	....	....	....	60	....	....	....	316	....	323	....	1385	....	1392	....	....
	Tensile	Batch	....	....	2607	....	....	....	3457	....	....	....	3305	....	....	....	3925	....
	(Meters)	Cont.	....	....	....	3695	....	....	....	4552	....	5125	....	5930	....	6575	....	....
Slash pine sulphite cook 3446	Burst	Batch	0.53	....	0.74	....	0.76	....	0.73	....	....	....	....	....	....	....	....	....
	(Pts./lb./ream)	Cont.	....	0.66	....	0.86	....	1.04	....	0.90	....	....	....	....	....	....	....	....
	Tear	Batch	2.36	....	2.13	....	1.86	....	1.70	....	....	....	....	....	....	....	....	....
	(Pts./lb./ream)	Cont.	....	1.92	....	1.43	....	1.23	....	0.91	....	....	....	....	....	....	....	....
Sulphite, cook 3443	Burst	Batch	0.90	....	1.20	....	1.24	....	1.27	....	....	....	....	....	....	....	....	....
	(Pts./lb./ream)	Cont.	....	1.19	....	1.44	....	1.43	....	1.49	....	....	....	....	....	....	....	....
	Tear	Batch	2.46	....	2.00	....	1.90	....	1.84	....	....	....	....	....	....	....	....	....
	(Pts./lb./ream)	Cont.	....	1.47	....	1.32	....	1.37	....	1.25	....	....	....	....	....	....	....	....
Mitscherlich sulphite shipment P-910	Burst	Batch	....	....	1.10	....	1.19	....	1.20	....	1.12	....	....	....	....	....	....	....
	(Pts./lb./ream)	Cont.	....	0.93	....	1.26	....	1.34	....	1.45	....	1.41	....	....	....	....	....	....
	Tear	Batch	....	....	1.94	....	1.97	....	1.80	....	1.55	....	....	....	....	....	....	....
	(Pts./lb./ream)	Cont.	....	1.76	....	1.29	....	1.27	....	1.03	....	1.06	....	....	....	....	....	....

TABLE IX—PHYSICAL PROPERTIES OF STUFFS PRODUCED BY THE RUBBER-COVERED MILLING ELEMENTS

Run A[2]	Data on mill charge: Kind of pulp	Weight of water, Kg.	Weight of oven dry pulp, Kg.	Weight of balls, Kg.	Consistency, Per cent	Diameter of balls, Inches	Mill speed, R.p.m.	Physical property[1]	Sampling interval (Minutes): 0	15	16	20	25	30	32	40	45	48	50	60	64	75	80	96	100	120	125	140	150	175	200	225	250	273
						Pebble mill used in this run			Bursting strength factor in points per pound per ream, 24 x 36—500																								
			0.03					B.																								
			.46					T.					0.19						0.37			0.47			0.56							
			1.0					A.F.L.					1.47 (0.67 mm.)						1.88 (0.60 mm.)			1.85			1.67 (0.44 mm.)		1.67 (0.37 mm.)					
C	Sulphite No 5	6	.15	8.16	2.5	1.5	65	B.																								
								T.											0.39			0.59			0.67			0.77	0.85	0.97	0.99	
			.46					T.											1.79			2.16			2.37			2.04	2.41	2.02	2.09	
D	do	6	.15	8.16	2.5	1.75	65	B.																								
								T.					0.19						0.31			0.34			0.54							
			.46					T.					1.23						1.82			1.74			2.02							
E	do	6	.15	8.16	2.5	50% 1.5 50% 1.75	65	B.																								
								T.					0.19						0.30			0.37			0.61							
			.46					T.					1.28						1.73			1.92			2.10							
F	do	6	.15	9.53	2.5	1.3	65	B.																								
								T.					0.23						0.31			0.49			0.73							
			.46					T.					1.32						1.89			2.03			2.10							
G	do	6	.15	9.53	2.5	1.75	65	B.																								
								T.					0.24						0.28			0.43			0.73							
			.46					T.					1.25						1.69			2.05			2.06							
H	do	6	.15	9.53	2.5	50% 1.5 50% 1.75	65	B.																								
								T.											0.29						2.11							
			.46					T.											1.63						0.53							
I	do	6	.15	11.34	2.5	1.3	65	B.																								
								T.											0.39						1.84							
			.46					T.											1.79						0.67							
J	do	6	.15	11.34	2.5	1.75	65	B.																								
								T.											0.34						2.16							
			.46					T.											1.74						0.50							
K	do	6	.15	11.34	2.5	50% 1.5 50% 1.75	65	B.																								
								T.											0.40						1.99							
			.46					T.											1.96						0.61							
L	do	7.35	.15	12.70	2	50% 1.5 50% 1.75	65	B.																								
								T.											0.28						2.21							
			.46					T.											1.38						0.61							
M	do	7.35	.15	12.70	2	89.7% 1.5 10.3% 1.75	65	B.																								
								T.											0.33						1.91							
			.46					T.											1.98						0.66							
			1.0					A.F.L.											(1.01 mm.)						2.15							
N	do	7.35	.15	13.61	2	1.5	65	B.											0.50						0.67							
			.46					T.											1.55						1.89							
O	do	7.35	.15	14.52	2	81.3% 1.5 18.7% 1.75	65	B.																								
								T.											0.46						1.88							
			.46					T.											1.99						0.70							
P	do	7.35	.15	18.14	2	1.5	65	B.																								
								T.											0.53						2.17							
			.46					T.											2.51						0.73							
Q	do	3.75	.15	18.14	4	1.5	65	B.																								
								T.																	2.58							
			.46					T.																	0.79							
R	do	6	.15	8.16	2.5	1.5	88	B.																								
								T.																	0.74							
			.46					T.																	2.72							
S	do	6	.15	8.16	2.5	1.5	106	B.																								
								T.																	0.82	0.94						
			.46					T.																	2.73							
T	do	7.35	.15	12.70	2	89.7% 1.5 10.3% 1.75	106	B.																								
								T.																	0.74	1.90						
			.46					T.																	2.82	1.84						
U	Sulphite No. 6	...	.165	9.98	2.5	1.5	106	B.																								
								T.																	0.87	0.94						
			.46					T.																	1.36	1.28						
V	do	5.5	.165	9.07	3	90% 1.5 10% 1.75	106	B.																								
								T.																								
			.46					Freeness																								
W	do	6	.150	8.16	2.5	1.5	106	B.																								
								T.																								
			.46					Freeness																								
X	do	6	.150	8.16	2.5	1.5	65	B.																								
								T.																								
			.46					Freeness																								

[1] B., T., and A.F.L. refer to bursting and tearing strengths and average fiber length, respectively.
[2] Run A was made with the pebble mill as a reference standard.

Table VIII) by the two procedures revealed that those obtained by the continuous method for the bursting, folding, and tensile strengths were 17.1, 28.0, and 53.5 per cent higher, respectively than those obtained by the batch method. The tearing strength maxima were equal but over the entire processing range the tearing strength of the stuff from the batch method was appreciably higher. Another fact observed was that when the batch method maximum bursting strength was reached the maxima for the folding and tensile strengths had been passed whereas the apparent maxima for all three by the continuous method were coincidental in time.

With the Douglas fir kraft pulp from digestion No. 2316 (Table VIII) the values for the maximum bursting strength were attained, but nevertheless a large increase in the folding and tensile strengths and small decrease in the tearing strength was noted.

The slash pine sulphite pulp from digestion No. 3446 (Table VIII) gave results with respect to burst and tear in agreement with those of the No. 2315 pulp as did the other two sulphite pulps that were processed.

It appeared then that the processing effects of this particular combination of charge variables in conjunction with the continuous method were similar to the effects of the batch method No. 101 insofar as the bursting strength developed in pulps, but quite different in respect to the tearing, folding, and tensile strengths.

Ball Mill

The processing conditions for the 23 runs made with the rubber-lined ball mill and the corresponding results are summarized in Table IX. Sulphite pulps Nos. 5 and 6 were used in these trials. Sulphite No. 5 was processed in the pebble mill following the procedure for the continuous method as a basis of comparison. This run is designated as A in Table IX.

Effect of Ball Size

Runs C. D, and E, using sulphite pulp No. 5, differ only in respect to the size of the rubber-covered balls used. Since the maximum was not reached in any of the three runs, only the difference in rate of development was observed. The charge using the balls of 1.5 inches in diameter developed the bursting and tearing strengths more rapidly than those with the 1.75-inch balls and a 50-50 mixture of the two sizes respectively. The mixture of sizes caused a more rapid development than did the 1.75-inch balls. These observations apply to a total weight of balls equal to 8.16 kg.

In runs F, G, and H, the weight of balls used was increased to 9.53 kg., an increase of 16.8 per cent. In this instance the order of rate of development was (1) all 1.5-inch balls, (2) all 1.75-inch balls, (3) 50 per cent by weight of each of the two sizes.

In runs I, J, and K, the weight of balls used was 11.34 kg. which is an increase over the first two charge-weights of 39 and 19 per cent, respectively. In this instance the order of the rate of development agreed with the weight-charge of 8.16 kg. that is, (1) 1.5-inch balls, (2) a mixture of 50 per cent each of 1.5-inch and 1.75-inch balls, (3) 1.75-inch balls.

In runs L and M the weight of balls was again increased but the consistence was lowered to 2 per cent. The 1.5-inch balls used in run L developed the bursting strength faster than the mixture of 89.7 per cent of 1.5-inch and 10.3 per cent of 1.75-inch balls up to 250 minutes of processing where the rate was just reversed. The combination in run M produced a better tearing strength over the entire processing range.

The general trend of the results relative to the effect of ball diameter indicates that a combination of the two sizes could be found that would be more effective than either size used alone for a given weight of balls.

Effect of Weight of Balls

In runs C, F, and I the weights of 1.5-inch balls were 8.16, 9.53, and 11.34 kg. respectively. At 125 minutes the bursting strength of run F was larger than that of C but the tearing strength was less. Run I, however, using a 39 per cent greater weight of balls than run C gave results that were the same as those of the run C.

The same series of weights with 1.75-inch balls were used in runs D, G, and J. The rate of the development of the bursting strength was lowest with the 8.16 kg. load, intermediate with the 11.34 kg. load, and the highest with the 9.53 kg. load. The tearing strength development was most rapid with this last load and about equal with the other two.

The above weight series was repeated in runs E, H, and K using 50 per cent of 1.5-inch and 50 per cent of 1.75-inch balls by weight. The rates of development of both bursting and tearing strengths was in terms of load (1) 9.53 kg., (2) 8.16 kg., and (3) 11.34 kg.

Runs L, N, and P represent a series at a consistence of 2 per cent instead of 2.5 per cent used in the above runs and the load of 1.5-inch balls was also greater. In this instance the 12.7 kg. load caused the highest rate of development of the bursting strength whereas the tearing strength showed the highest rate under the 18.14 kg. load.

In general these results suggest that there is an optimum weight of balls for securing relatively rapid development of bursting strength for a given consistence and weight of pulp; that within narrow limits an increase in the weight of the balls results in an increase in the rate of development of the bursting strength and frequently an increase in that of the tearing strength; and that an increase in the weight of the balls used and a corresponding slight decrease in the consistence increase the rate of development of the bursting strength.

Effect of Mill Speed

Runs C, R, and S were made under the same conditions with the exception of the mill speeds which were 65, 88, and 106 r.p.m., respectively. The rate of the development, of the bursting strength and the corresponding decrease of the tearing strengths is greater at speeds of 88 and 106 than at 65 r.p.m. The difference in the processing effects between the mill speeds of 88 and 106 r.p.m. is not critical.

Runs W and X also illustrate the effect of mill speed, the former being run at 106 and the latter 65 r.p.m. In run W at the end of the 30 minute period, 3,180 revolutions were completed, and the resulting stuff had bursting and tearing strengths of 0.92 and 2.54, respectively. In run X at the end of the 50 minute period, 3,250 revolutions were completed and the corresponding strength values were 0.90 and 1.73, both of which are lower, although it should be noted that the difference between the two values for the bursting strengths is within experimental error. However, when the 75-minute stuff from run W is compared with the 100- and 200-minute stuffs from run X it appears that a stronger stuff can be prepared at the lower mill speed but a relatively long processing time is required. Although it is not positively shown in either run that the maximum bursting strength was attained, experience indicates that where one or two additional processing periods

TABLE X.
DATA FOR THE BEATER RUN ON THE NO. 5 SULPHITE PULP

Roll operation		Stuff properties			
Distance of roll from bed-plate Inch	Time rotated at setting Min.	Time in beater Hours	Bursting strength Pts./lb./ream,	Tearing strength 24x36—500	Average fiber length Mm.
0.0100	10	3½	0.64	1.71	0.72
.0088	10	3¾	.68	1.90	.70
.0066	10	4	.74	1.84	...
.0055	20	4¼	.76	1.81	...
.0044	30	4½	.81	1.74	.63
.0033	35	4¾	.75	1.71	.55

cause an increase of but 0.02 or 0.03 in the bursting strength, the next period of processing is likely to effect a dimunition in the bursting strength or, at least, effect no increase. Hence it is reasonable to assume that the bursting strength of 1.12 is very close to the true maximum value of the pulp processed for 75 minutes under the conditions of run W. The 150-minute stuff of run X has a bursting strength of 1.32 which is 18 per cent higher than the maximum value of that from run W, and the tearing strength is about 3 per cent less. The freeness values of the two stuffs are the same.

Average Fiber Length

The average fiber length is reduced relatively slowly under the processing conditions that are productive of the best strength. This is illustrated by the date given in Table IX for run M. The original fiber length in this instance was not determined but was approximately 1.0 mm.

Opacity

Although the opacity of the test sheets made from rubber ball-milled stuff was not determined quantitatively the degree of retention of this property at the maximum strength values was so pronounced as to be easily observed and contrasted with the translucency of test sheets of maximum strength prepared from stuffs processed for a much shorter time in a pebble mill.

Beater

The sulphite pulp No. 5 was processed in the 25-pound beater to obtain a comparison of the processing effects of the three different types of apparatus, particular care being taken to select a beating schedule that might produce a stronger stuff than that yielded by the pebble mill. This schedule is given in Table X and it constitutes one of mild treatment over a relatively long period of time so as to secure considerably more fibrillation, that is to say, develop the greatest effective surface possible in proportion to the amount of cutting perpendicular to the longitudinal axes of the fibers. As a result, the maximum bursting strength developed during beating was 0.81 points when the average fiber length was 0.63 mm. The maximum bursting strength developed in the No. 5 sulphite pulp by the pebble mill was but 0.60 points and the average fiber length of this stuff was reduced to 0.44 mm.

Comparison of the Three Types of Apparatus

A summary of the maximum bursting and tearing strengths with the average fiber lengths of those particular stuffs developed in the No. 5 sulphite pulp by the three types of processing units is recorded in Table XI and graphed in Fig. 7. Photomicrographs of fibers from the test sheets upon which the test values were determined, are shown in Fig. 8. The dotted and solid curves in Fig. 7 illustrate respectively the relation between the average fiber length and the bursting and tearing strengths developed in the sulphite pulp No. 5 by the three types of processing units. The apparent linear relation of the portions of the bursting strength curves graphed is most probably a coincidence particularly since those for the pebble mill and beater passed through a maximum. Apparently also the maximum burst was not reached in the rubber-lined ball mill. It is evident that beating developed more strength in the pulp than did pebble milling and that ball milling developed more than either of the other two. It is also evident that it is possible to select an average fiber length common to all three stuffs yet with corresponding bursting strengths that differ widely. The slopes of these curves show that the rate of fiber length reduction was less during the beating than during the pebble milling and the rate of reduction during ball milling was less than either of the first two methods. This suggests a difference in type or extent or both of fibrillation effected by the three types of units.

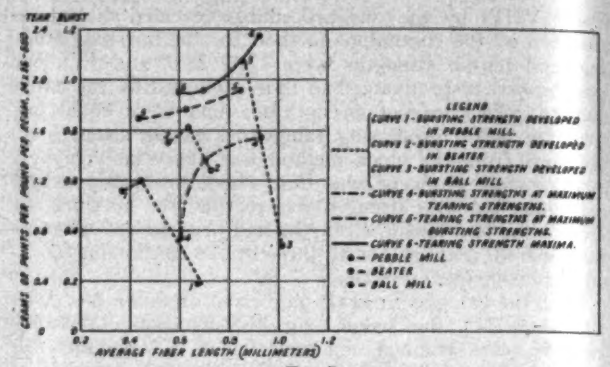


FIG. 7
Comparison of three types of processing units using commercial sulphite pulp No. 5.

A photomicrograph of the unprocessed sulphite pulp No. 5 is shown in A, Fig. 8. The pulp was below average in strength and contained many broken fibers. The bursting and tearing strengths were 0.03 and 0.46 respectively.

In the pebble mill test this pulp developed a maximum bursting strength of 0.60 in 100 minutes of milling. The data from the pebble mill test are given in Table IX. The tearing strength at this point was 1.67 points and the average fiber length, 0.44 mm. This stuff is shown in C of Fig. 8. The cell walls of these fibers are disintegrated to a considerable degree, accompanied by a large amount of cutting across the longer dimension.

The maximum tearing strength developed was 1.88

TABLE XI.—PROCESSING EFFECTS OF THREE TYPES OF PROCESSING UNITS

		Bursting strength and average fiber length of the stuff at the point of maximum tearing strength				Tearing strength and average fiber length of the stuff at the point of maximum bursting strength				
Process method	Run	Time measure	Maximum tearing strength developed Pts./lb./ream, 24x36—500	Bursting strength at maximum tearing strength	Average fiber length Mm.	Photomicrograph in figure 8	Time measure	Maximum bursting strength developed Pts./lb./ream, 24x36—500	Tearing strength at maximum bursting strength	Average fiber length Mm.	Photomicrograph in figure 8
None	...	0	0.46	0.03	about 1.0	A	0	0.03	...	...	A
Milled in pebble mill	A	3,000 revs.	1.88	.37	0.60	D	6,000 revs.	.60	1.67	0.44	E
Beaten in No. 2 beater	288	3¾ hours	1.90	.68	.70	B	4½ hours	.81	1.74	.63	C
Milled in ball mill	M	11,375 revs.	2.32	.77	.93	F	17,875 revs.	1.07	1.91	.85	G

points in a period of 50 minutes. The bursting strength at this point was 0.37 points and the average fiber length 0.60 mm. These fibers are shown in B of Fig. 8. Some disintegration of the cell wall is discernable, but it is less than in the 100-minute stuff and in addition the average fiber length is 36 per cent greater.

When the sulphite pulp No. 5 was processed in a beater a maximum bursting strength of 0.81 points was developed in 4½ hours. The tearing strength and the average fiber length at this point were 1.74 points and 0.63 mm. respectively. These values, in the order given, are 35, 42, and 43 per cent greater than the corresponding ones of the pebble-milled stuff.

The maximum tearing strength of the beaten stuff 1.90 points, occurred at the 3¾-hour period accompanied by a bursting strength of 0.68 points and an average fiber length of 0.70 mm. These values exceed the corresponding ones for the pebble-milled stuffs by 1.06, 84, and 16.7 per cent, respectively. Fibers from the pulp, processed in the beater for 3¾ hours are shown in D, and those from the pulp pebble-milled for 50 minutes, in B of figure 8.

A comparison of the photomicrographs of the beaten and pebble-milled stuff illustrate that the beating treatment worked out the fibrils of the cell wall at a far smaller sacrifice of fiber length than did the pebble mill treatment. The latter tends rapidly toward complete disintegration of the fibers, resulting in inferior strength properties.

The ball mill effected a maximum bursting strength of 1.07 points in a period of 275 minutes. This value exceeds the maximum values for the beaten and pebble-milled stuffs by 32 and 76.3 per cent, respectively. The tearing strength at this point was 1.91 points, a value practically the same as the maxima for the other two stuffs. The average fiber length of this stuff was 0.85 mm. which was 35.0 per cent greater than the corresponding beaten stock and 93 per cent greater than the corresponding pebble-milled stock. The photomicrographs F and G reveal that the ball mill treatment loosened and worked out the fibrils of the cell wall to a large extent with probably not more than a 33 per cent decrease in the average fiber length. This type of fibrillation is more desirable than that caused by the pebble mill or even the beater, since the former yields a sheet of greater strength and opacity.

The remarkable qualities of stock produced by the rubber-covered milling elements are high bursting strength, the unusually high tearing strength retained at the point of maximum bursting strength, the unusual degree of opacity at the point of maximum bursting strength, and the high average resultant fiber length.

It appears that these properties are due largely to the particular type and degree of fibrillation associated with a relatively small decrease in the average fiber length of the stock that is produced by this processing unit.

It is not unreasonable to assume that this type of fibrillation which seems to be a more or less open net work of the outer layers of the cell wall increases the total fiber surface effective in fiber-fiber contact and activates these surfaces so that when such contacts are made, supported by an underlying fiber skeleton that is longer than is usually found with this degree of fibrillation, unusually strong bonds result.

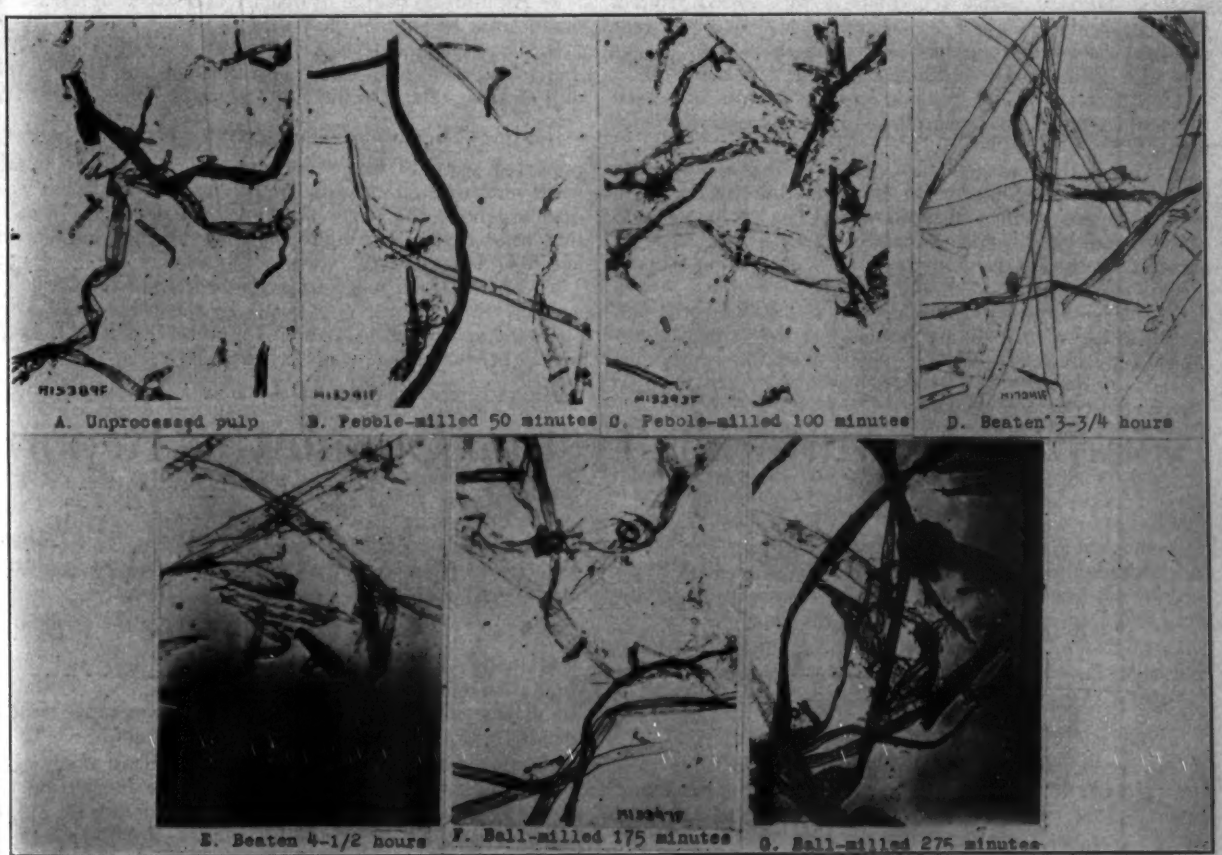


FIG. 8.
Photomicrographs of samples listed in Table II.

Conclusions

A. USING THE PEBBLE MILL, THE FOLLOWING CONCLUSIONS WERE DRAWN:

1. The old jar liners, having a volume 8.6 per cent greater than the new liners, effected a bursting strength in a kraft pulp 6.5 per cent higher than that developed in the new liners, but a longer milling time was required. With a sulphite pulp, a 8.7 per cent higher bursting strength resulted in the old liners than in the new, these maxima being coincidental in time.

2. The processing effects of the new liners on a kraft pulp were the same but in the case of a sulphite pulp two liners of volume practically the same as the other two liners effected a bursting strength 11.4 per cent higher.

3. The stirring of the pebble-milled stuffs prior to the formation of test sheets is advantageous in that it breaks up the clumps of fibers that are formed during milling with the result that an improved sheet formation is obtained with a corresponding increase in the strength properties.

4. The speed of rotation, of the mill using pebbles, within a range of 52 to 62 r.p.m. was not critical in its effect on the strength properties of the pulps. Apparently, as the speed of rotation of the mill increases above 60 r.p.m., the increasing centrifugal force causes the charge to slide as a mass, at the consistence used of 4.3 per cent, thus decreasing the milling effect.

5. For the range studied, a correlation of jar volume and the corresponding bursting strength could not be made.

6. When the consistence of the Forest Products Laboratory standard pebble mill method was varied from 2 to 6 per cent, it was observed that the 2 to 3 per cent consistences resulted in bursting strengths about 25 per cent higher than those developed at 6 per cent consistence.

7. A decrease of the ratio of pulp to pebbles increased the rate as well as the magnitude of the strength development.

8. The continuous method of pebble milling can be made to yield the same value for the maximum bursting strength but the development will be slower. The other strength properties do not coincide in value and the tearing strength curve is even of a different type, showing, in most cases, a rapid decrease.

9. The maxima of the folding and tensile strengths had been passed, when the maximum bursting strength was reached in the batch method, whereas in the continuous method the apparent maxima of all three were coincidental in time.

10. Test results could be duplicated with a suitable degree of accuracy.

11. The pebble mill developed less strength in a commercial sulphite pulp than did the beater or the ball mill. The rate of reduction of average fiber length was greater in the pebble mill than in either of the other two units.

B. USING RUBBER COVERED BALLS:

1. The general trend of the results relative to the effect of ball-diameter indicate that a combination of the two sizes could be found that would be more effective in producing high strength properties than either size used alone for a given weight of pulps.

2. There is an optimum weight of balls for securing relatively rapid development of bursting strength for a given consistence and weight of pulp.

3. Within rather narrow limits an increase in the weight of the balls results in an increase in the rate of development of the bursting strength and frequently an increase in that of the tearing strength.

4. An increase in the weight of the balls used and a corresponding slight decrease in the consistence increases the rate of development of the bursting strength.

5. In a range of mill speed from 65 to 106 r.p.m. inclusive, it appeared that a stronger stuff can be prepared at a lower mill speed but a relatively long processing time is required.

6. The average fiber length is reduced very slowly under the processing conditions that are productive of the best strength in the ball mill.

7. An unusual degree of opacity is retained in test sheets made from ball milled pulps.

8. The ball mill developed a greater strength in a commercial sulphite pulp than did either a beater or a pebble mill and the rate of reduction of average fiber length was less.

9. On the whole the rubber-covered milling elements imparted strength and other properties to the pulp that were very unusual. It appeared that these properties were due largely to the particular type and degree of fibrillation associated with a relatively small decrease in the average fiber length of the stock.

C. THE BEATER, when properly operated, can develop a greater strength in a pulp than can the pebble mill when operated according to standard Forest Products Laboratory procedure.

Non-Fibrous Materials Testing Committee Report*

Manual of Standards

During the year TAPPI has issued an excellent loose-leaf book entitled "Testing Methods—Recommended Practices—Specifications of the Technical Association of the Pulp and Paper Industry" (TAPPI Standards).

In this book numbers T600m-T618m, inclusive, represent methods of the Non-Fibrous Materials Testing Committee.

Salt Cake, Water and Rosin

During the past year methods for analysis of Salt Cake and Analysis of Water have been published in the Paper Trade Journal of November 2, 1933. In addition, a method for the Analysis of Rosin will appear shortly.

Official Methods

A number of methods were advanced by ballot of the Association from Tentative Standard to Official Standard. These were T604m and T607m-T615m, inclusive.

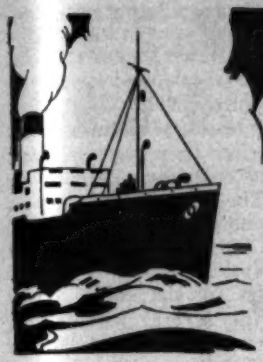
Sulphur, Lime and Limestone

Methods for the Analysis of Sulphur, Lime, and Limestone (T616m, T617m, and T615m) have been Tentative Standards since November 2, 1932. The committee recommends their advancement to Official Standards.

The committee has a considerable number of methods in various stages of preparation. Suggestions from members of the association as to needed methods for the testing of non-fibrous materials will be welcome.

W. A. CHAPMAN, Chairman,
Skinner & Sherman, Inc., Boston, Mass.

* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 19 to 22, 1934.



IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING MAY 12, 1934

CIGARETTE PAPER

Liggett & Myers Tobacco Co., Champlain, Havre, 17 cs.

WALL PAPER

F. J. Emmerich, Deutschland, Hamburg, 1 ble.

NEWSPRINT

Jay Madden Corp., Scanyork, Gdynia, 550 rolls; Lunham & Reeve, Inc., by same, 289 rolls; Perkins Goodwin & Co., Deutschland, Hamburg, 315 rolls; Parsons & Whittemore, Inc., by same, 502 rolls; ———, Stavangerfjord, Oslo, 342 rolls.

PRINTING PAPER

International F'd'g Co., Black Gull, Antwerp, 1 cs.; Ozalid Corp., Havel, Bremen, 319 cs.; E. Dietzgen & Co., Deutschland, Hamburg, 4 cs.

PACKING PAPER

F. C. Strype, Deutschland, Hamburg, 13 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., American Farmer, London, 9 cs.

FILTER COMPOUND

Gerhard & Hey, Havel, Bremen, 50 pkgs.

DRAWING PAPER

H. Reeve Angel & Co., Inc., American Farmer, London, 4 cs.; A. Brown & Bro., Deutschland, Hamburg, 9 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Laconia, Liverpool, 3 cs. (simplex).

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L. A. Consmiller, Bremen, Bremen, 7 cs.; Sellers Transportation Co., by same, 26cs.; Sellers Transportation Co., Deutschland, Hamburg, 5 cs.

METAL COATED PAPER

K. Pauli Co., St. Louis, Hamburg, 26 cs.; K. Pauli Co., Deutschland, Hamburg, 35 cs.

SURFACE COATED PAPER

Chas. Happel, St. Louis, Hamburg, 8 cs.; Gevaert Co. of America, Black Gull, Antwerp, 12 cs.; Globe Shipping Co., Havel, Bremen, 16 cs., 12 crates.

COATED PAPER

W. J. Byrnes, Berengaria, Southampton, 5 cs.

BASIC PAPER

F. C. Strype, Havel, Bremen, 29 cs.; Dingelstedt & Co., by same, 9 cs.

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International F'd'g Co., St. Louis, Hamburg, 7 cs.; International F'd'g Co., Deutschland, Hamburg, 3 cs.

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American Express Co., St. Louis, Hamburg, 1 cs.

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F. C. Strype, Laconia, Liverpool, 2 cs.; B. F. Drakenfeld & Co., Laconia, Liverpool, 5 cs.

TRANSFER PAPER

———, Deutschland, Hamburg, 5 cs.

CARD BOARD

Flexideal, Deutschland, Hamburg, 20 cs.

MISCELLANEOUS PAPER

T. N. Fairbanks, Tokai Maru, Yokohama, 7 cs.; ———, Havel, Bremen, 36 cs.

RAGS, BAGGING, ETC.

E. J. Keller Co., Inc., Schodack, ———, 34 bls. flax waste; E. J. Keller Co., Inc., Schodack, ———, 86 bls. rags; E. J. Keller Co., Inc., St. Louis, ———, 25 bls. rags; E. J. Keller Co., Inc., Black Gull, ———, 362 bls. rags; E. J. Keller Co., Inc., Black Gull, ———, 128 bls. bagging; W. Steck & Co., Black Gull, Antwerp, 102 bls. flax waste; Darmstadt Scott & Courtney, Black Gull, Antwerp, 177 bls. jute waste; Chase National Bank, Black Gull, Antwerp, 40 bls. cotton waste; J. J. Ryan & Son, Black Gull, Antwerp, 128 bls. cotton waste; G. A. Henshaw & Son, Coelleda, Belfast, 120 bls. paper stock; M. Snedeker Corp., Coelleda, Belfast, 182 bls. paper stock; M. Snedeker Corp., Exilona Istanbul, 61 bls. rags; T. D. Downing & Co., Tuscania, Glasgow, 85 bls. bagging; Chase National Bank, American Farmer, London, 28 bls. rags; Chase National Bank, Havel, Bremen, 112 bls. jute waste; E. J. Keller Co., Inc., Eastern Prince, ———, 23 bls. rags; E. J. Keller Co., Inc., Chr. Sass, ———, 44 bls. rags; E. J. Keller Co., Inc., Western World, ———, 12 bls. rags.

OLD ROPE

E. J. Keller Co., Inc., St. Louis, – ——, 10 bls.

CASEIN

D. C. Andrews & Co., St. Louis, Hamburg, 50 bags; D. C. Andrews & Co., Deutschland, Hamburg, 55 bags.

WOOD PULP

Bank of N. Y. Trust Co., St. Louis, Hamburg, 280 bls. wood pulp, 56 tons; Perkins Goodwin & Co., Scanyork, Gdynia, 200 bls. wood pulp, 30 tons; M. Sone, Scanyork, Gdynia, 900 bls. wood pulp, 135 ton; Lagerloef Trading

Co., Scanyork, Helsingfors, 750 bls. sulphite, 127 tons; The Borregaard Co., Inc., Stavangerfjord, Oslo, 168 bls. sulphate; Chemical Bank Trust Co., Stavangerfjord, Oslo, 300 bls. sulphite; Bank of N. Y. Trust Co., Deutschland, Hamburg, 235 bls. wood pulp, 47 tons; M. Sone, Deutschland, Hamburg, 250 bls. wood pulp; Bulkley Dunton & Co., Volendam, ———, 560 bls. wood pulp.

WOOD PULP BOARDS

Castle & Overton, Inc., St. Louis, Hamburg, 210 bls., 42 tons; Lagerloef Trading Co., Scanyork, Helsingfors, 50 bls., 7 tons.

ALBANY IMPORTS

WEEK ENDING MAY 12, 1934

Halifax Power & Pulp Co., Laila Sheet, Harbor, 5920 bls. ground pulp; Halifax Power & Pulp Co., Laila Sheet, Harbor, 480 bls. screenings.

BOSTON IMPORTS

WEEK ENDING MAY 12, 1934

Stone & Downer Co., Laconia, Liverpool, 1 cs. glazed paper; Stone & Downer Co., Laconia, Liverpool, 16 bls. rags; G. F. Malcolm, Inc., Laconia, Liverpool, 10 cs. tissue paper; Ayres W. C. Jones Co., Laconia, Liverpool, 51 bls. cotton waste; Brown Bros. Harriman Co., American Farmer, London, 182 coils old rope; Brown Bros. Harriman Co., American Farmer, London, 165 bls. waste paper; Crocker Burbank Co., American Farmer, London, 330 bls. waste paper; Bulkley Dunton & Co., Belos, ———, 3120 bls. wood pulp; Bulkley Dunton & Co., Eiffel, ———, 250 bls. wood pulp.

BALTIMORE IMPORTS

WEEK ENDING MAY 12, 1934

Congoelum Nairn Co., Schodack, Dunkirk, 290 bls. rags; Congoelum Nairn Co., Schodack, Havre, 261 bls. rags; Congoelum Nairn Co., Black Gull, Antwerp, 127 bls. rags; M. Sone, City of Hamburg, ———, 1250 bls. wood pulp; Bulkley Dunton & Co., Belos, ———, 2750 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING MAY 12, 1934

E. J. Keller Co., Inc., Black Gull, ———, 181 bls. bagging.

Decision in Calcasieu Paper Co. Case

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., May 16, 1934—A "company's unhealthy dominance" of a Louisiana town was referred to in the National Labor Board decision, made public last week, in the case of the Calcasieu Sulphate Paper Company, of Elizabeth, La.

The case originated in a complaint of the International Brotherhood of Paper Workers, alleging discharge of workers for union activity last January. The New Orleans Regional Labor Board recommended their reinstatement.

The text of the Board's decision follows:

"The Calcasieu Sulphate Paper Company of Elizabeth, La., has been subject to the Paper and Pulp Industry Code since it went into effect November 27.

"Shortly thereafter John Dees and Oliver Dees, each of whom had worked for the company for seven years, and Frank Brown, an employee for nearly five years, began to promote the interests of the International Brotherhood of Paper Workers. On January 12 they were discharged. A claim that the discharges were in violation of Section 7 (a) was presented to the New Orleans Regional Labor Board by the union. The discharged employees offered testimony at the hearing on February 20 that the attitude of the company was hostile to the union and that they were discharged the day after they had circulated a union membership petition. The company's defense was chiefly based upon affidavits. The Board recommended reinstatement, and when the company failed to comply, referred the case to the National Labor Board.

"At the hearing before the National Labor Board on April 17, there were no witnesses for the union, but its representative cross-questioned the several witnesses of the company. These witnesses testified that John and Oliver Dees had in recent months shown themselves increasingly careless workmen; that Frank Brown was an irregular worker and a notoriously irresponsible young man; that these were three of five men discharged in reorganizing the operations of the plant, and that they were let out because their work was inferior to that of the other men of their classifications who were retained; that the reorganization was planned some weeks before the discharges took place, and that it was mere chance that the discharges occurred immediately after the circulation of the union petition. The Union admitted, by a membership list it furnished confidentially to the Board, that the other two men discharged were not union members and that union members are still working for the company.

"The company's explanation of the discharges is not directly controverted by anything before us except the affidavits of the three employees, each of whom in general terms asserted that his work was satisfactory. This entire lack of testimony to gainsay the detailed explanations of the company makes it impossible to conclude that the discharges were motivated materially by a desire to interfere with self-organization or collective bargaining or that the employer was making non-membership in a union a condition of employment.

"The National Labor Board therefore dismisses the claim of violation of Section 7 (a) of the National Industrial Recovery Act as unproved.

"Although the charges of violation were not proved, it does follow that, as a contribution to social and industrial welfare, the company would not do well voluntarily to reinstate these employees. Elizabeth is a town of less than 2500 inhabitants situated twelve miles through the woods from the nearest settlement. The lumber and paper mills offer the only work in the town and so control it that employees undoubtedly are apprehensive that their rights under Section 7 (a) will not be respected. The company's unhealthy dominance of the community is suggested by the fact that the Dees family have become wayfarers since they were ousted from their company-owned house in March; and that the witnesses for the company in Washington persistently addressed their testimony to the company's attorney rather than to the members of the National Labor Board. The observations and experiences of the secretary of the New Orleans Regional Labor Board when he visited Elizabeth in an attempt to get its ruling carried out confirm the impression we derive from these incidents.

"The rehiring of the Deeses and Brown would help to dispel this atmosphere of apprehension and provide proof of the company's desire to facilitate the recovery endeavors of the nation. The National Labor Board, therefore, supports the recommendation of the New Orleans Board that they be reinstated.

"We do not discuss other alleged violations of the code as they are separable and are being handled by the Code Authority."

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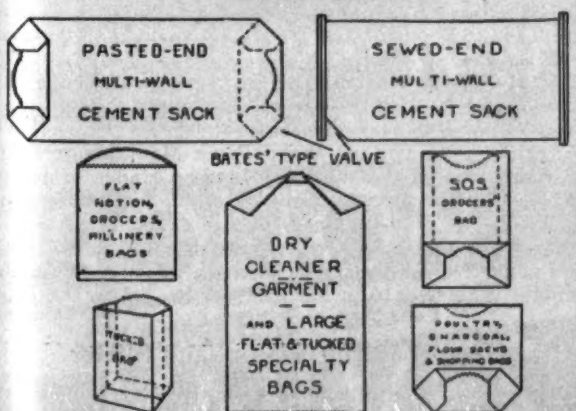
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Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, May 16, 1934.

Trading in the local paper market was moderately active during the past week. Demand for the various standard grades of paper, however, is considered satisfactory for the time of year. Sales forces of the leading paper organizations continue optimistic regarding the future. Prices are steady to firm.

The position of the newsprint paper market continues to improve. Production of newsprint in the United States, Canada and Newfoundland was 32 per cent higher in the first four months of the year than in the corresponding period of 1933. Circulations of the leading newspapers have materially increased and advertising volume for the first four months was 18 per cent higher than last year.

Conditions in the fine paper market are favorable. The book paper market is firm. Advertising volume of the leading monthly magazines and periodicals increased 43 per cent in May compared with the same month a year ago. Lineage in the rotogravure sections of United States newspapers showed a 46 per cent gain in the first three months of the year over the same period of 1933.

Mechanical Pulp

The ground wood pulp market is exhibiting a strong undertone. Production of mechanical pulp in the United States and abroad is practically keyed to consumption and the industry is still in a sound statistical position. Prices are generally holding to previously quoted levels without difficulty.

Chemical Pulp

Demand for the various grades of domestic and imported chemical pulp is fairly persistent for the season. Kraft pulp and unbleached sulphite pulp are still in good request, while there are signs of increased interest in bleached sulphite. Prices are holding to schedule and there is talk around of increased quotations to justify increased costs of production.

Old Rope and Bagging

The old rope market continues listless. Demand for domestic and imported old manila rope is still restricted. Small mixed rope is moving slowly. Old rope prices, however, are steady. The bagging market is irregular. Scrap and gunny bagging are quiet, although roofing bagging is fairly active.

Rags

No radical changes transpired in the domestic rag market. New cotton rags are in fairly satisfactory demand, especially No. 1 white shirt cuttings and fancy shirt cuttings. Roofing grades are more buoyant than of late. The imported rag market is irregular, due to the uncertainty of the foreign exchange situation.

Waste Paper

Board mill demand for the lower grades of paper stock is slightly better than of late. Strictly over-issue news is in a particularly strong position owing to heavy export demand. The higher grades of waste paper are steadier.

Twine

Most of the business transacted in the local twine market during the past week was along routine lines. Demand for the various grades is about normal for the season and the outlook for the future is considered favorable, in most well-informed quarters. Prices are holding well.

Strike Closes Package Paper Co.

HOLYOKE, Mass., May 15, 1934.—Employees of the Package Paper Company, waxed paper converters, to the number of 125, went out on a strike Friday afternoon because of dissatisfaction with one of the department officials which the company declined to remedy. There was no complaint of hours or wages.

Nathaniel Sage, plant manager, stated that he had offered to arbitrate and that the men had refused. The action had been preceded by a strike vote to take effect Monday. The company thereupon posted a notice that the plant would be closed down for an indefinite period on Monday; the employees then held a meeting and voted to go out Friday afternoon.

The manager said after the strike that the shutdown would be indefinite. Strikers were posted about the plant, but is understood that the mill will not open for some time.

Paper Salesmen's Association Growing

[FROM OUR REGULAR CORRESPONDENT]

There was another excellent attendance at the regular weekly luncheon and meeting of the Eastern Division of the Salesmen's Association of the Paper Industry, held in the Tavern Room of the Hotel Commodore on Monday last.

R. S. Kellogg, secretary of the Newsprint Service Bureau, Major O. M. Porter, secretary of the United States Wood Pulp Producers Association; Dr. E. O. Merchant, secretary of the Ground Wood Paper Manufacturers Association, and representatives of other grades of paper, gave an authoritative picture of conditions in their particular groups of the industry.

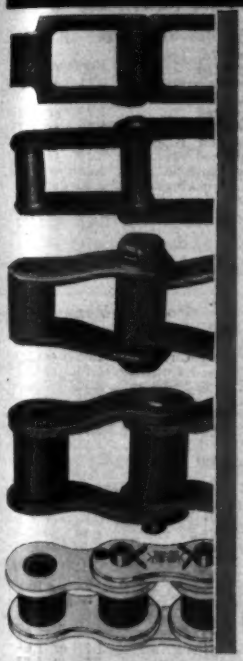
During the meeting it was reported that the association had gained 45 new members recently, including 29 in the Middle West and 16 in the East.

New Waldron Cellophane Slitter

The John Waldron Corporation of New Brunswick, N. J., manufacturers of paper converting machinery for over 100 years, have designed a new cellophane slitter which provides many notable advantages.

This new Waldron slitter will cut out cellophane with a clean shear cut edge, without any fuzz or cracks on the edge of the cellophane, and it provides for a uniform winding tension on all strips.

LINK-BELT Chains



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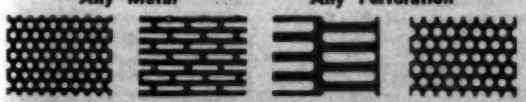

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LAWRENCE—MASSACHUSETTS
3788

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, May 16, 1934.

BLANC FIXE.—Conditions in the blanc fixe market are fairly satisfactory. Prices remain unchanged. The pulp is quoted at from $42.50 to $45 per ton, in bulk; while the powder is selling at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER.—The bleaching powder market is moderately active. Shipments against contract are moving in fairly good volume. Prices are holding to schedule. Bleaching powder is selling at from $1.90 to $2.15 per 100 pounds, in drums, at works.

CASEIN.—The casein market continues firm. Domestic standard ground is quoted at 12½ cents and finely ground at 13 cents per pound. Argentine standard ground is selling at 15½ cents and finely ground at 16 cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Steadiness prevails in the caustic soda market. The contract movement is normal. Solid caustic soda is quoted at from $2.60 to $3.10; while the flake and ground are selling at from $3 to $3.05 per 100 pounds, in large drums, at works.

CHINA CLAY.—The china clay market is fairly active. Contract shipments are going forward freely. Imported china clay is still quoted at from $13.50 to $21 per ton, ship side; while domestic paper making clay is selling at from $5 to $12 per ton, at works.

CHLORINE.—Demand for chlorine from the paper mills is fairly persistent. The contract movement is well up to average. Prices are steady. Chlorine is quoted at from $2 to $2.25 per 100 pounds, in tanks, or multi-unit cars, in ton lots, or over, at works.

ROSIN.—The rosin market is slightly weaker. The grades of gum rosin used in the paper mills are quoted at from $5.80 to $6.00 per 280 pounds, in barrels, at works; while wood rosin is selling at $4.70 per 280 pounds, in barrels, at southern shipping points.

SALT CAKE.—The salt cake market is fairly buoyant. Contract shipments are moving in good volume. Salt cake is quoted at from $12 to $14; chrome salt cake at from $12 to $12.50 per ton, at works; and imported salt cake at from $12 to $12.50 per ton, on dock.

SODA ASH.—Trading in the soda ash market is brisk for the time of year. Prices are generally holding to schedule, without difficulty. Quotations on soda ash, in car lots, at works, are as follows: in bulk, $1.10; in bags, $1.40; and in barrels, $1.50.

STARCH.—The starch market is practically marking time. Paper mill demand is rather listless at present. Prices are holding to schedule. Special paper making starch is quoted at $2.67 per 100 pounds, in bags; and at $2.95 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—Paper mill demand for sulphate of alumina is well sustained. Prices are steady to firm. Commercial grades are still quoted at from $1.35 to $1.50; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market continues steady. Sulphur is quoted at $18 per long ton on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton on any smaller quantity over that period. On spot and near by car loads the quotation is $21 per ton.

TALC.—Most of the business transacted in the talc market during the past week was along routine lines. Domestic talc is quoted at from $16 to $18 per ton, in bulk, at eastern mines; while imported talc is selling at from $23 to $30 per ton, on dock.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	6.50	@	—
Bonds	6.00	@	—
Index	6.00	@	—
Writings—			
Extra Superfine	6.50	@	—
Superfine	6.25	@	—
Tub sized	5.75	@	—
Engine sized	5.50	@	—
Book, Cased—			
S. & S. C.	5.35	@	5.75
S. & S. C. Litho.	5.60	@	6.00
M. F.	5.10	@	5.50
Coated and Enamel	5.90	@	6.55
Coated Litho	5.90	@	6.35
Flatses—Per Ream—			
White No. 1	.82½	@	.85
White No. 2	.67½	@	—
Anti-Tarnish M. G. only	1.00	@	—
Colored	.85	@	—
Kraft	.70	@	—
Manila	.67½	@	.70
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Butchers	4.00	@	4.50
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75
Common Bogus	1.50	@	3.00
Screenings	2.50	@	3.50
Glassine—			
Bleached	.11	@	—
Unbleached	.09	@	—

(The following Quotations are Delivered New York)

News, per ton—			
Roll, contract	40.00	@	—
Rolls, spot	40.00	@	—
Sheets	45.00	@	—
Kraft—			
No. 1 Domestic	4.75	@	5.00
No. 2 Domestic	3.87½	@	—
Southern	3.87½	@	—
Boards—per ton—			
News	45.00	@	50.00
Chip	42.50	@	47.50
Sgl. Mla. LL Chip	52.50	@	55.00
Jute Lined Chip	52.50	@	55.00
White Patent Coated	65.00	@	70.00
Binders Boards	68.00	@	72.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	27.00	@	29.00
Dry	27.00	@	30.00
(F.o.b. Mill)			
No. 1 Domestic and Canadian	24.00	@	29.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Division 1	2.85	@	—*
Division 2	2.80	@	—*
Division 3	2.75	@	—*
Prime Qualities—			
Class 1. All Prime Easy Bleaching	2.25	@	—*
Other Than Easy Bleaching—			
Class 2. Higher Than Standard	2.20	@	—*
Class 3. Standard	2.15	@	—*
Class 4. Lower than Standard	2.10	@	—
(On Dock, Atlantic Ports)			
Kraft No. 1	1.85	@	1.90
Kraft No. 2	1.60	@	1.70
(F.o.b. Pulp Mill)			
Kraft Domestic (Delivered)	1.60	@	2.75
Soda Bleached	2.50	@	—

*Add 60 Cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.00
Silesias No. 1	4.25	@	4.50
New Unbleached	6.75	@	7.25
New Soft Blacks	3.00	@	3.25
Blue Overall	4.00	@	4.25
Fancy	2.50	@	2.75
Washables	1.75	@	2.00
Mixed Khaki Cuttings	3.00	@	3.25
O. D. Khaki Cuttings	3.75	@	4.00
Men's Corduroy	1.50	@	1.75
New Mixed Blacks	2.50	@	2.75

Old Rags

White, No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.75	@	3.25
White, No. 2—			
Repacked	1.75	@	2.25
Miscellaneous	1.50	@	1.75
Thirds and Blues—			
Repacked	1.50	@	1.75
Miscellaneous	1.25	@	1.50
Black Stockings	2.50	@	3.00
Roofing Rags—			
No. 1	1.10	@	1.25
No. 2	.80	@	.85
No. 3	.70	@	.75
No. 4	.65	@	.70
No. 5A	.60	@	.65

Foreign Rags

New Rags

New Dark Cuttings	1.60	@	1.70
New Mixed Cuttings	1.75	@	1.85
New Light Silesias	3.75	@	4.00
Light Flannelettes	3.75	@	4.00
Unbleached Cuttings	6.50	@	6.75
New White Cuttings	6.50	@	6.75
New Light Oxfords	3.25	@	3.50
New Light Prints	2.75	@	3.00

Old Rags

No. 1 White Linens	7.50	@	8.00
No. 2 White Linens	6.50	@	7.00
No. 3 White Linens	4.50	@	5.00
No. 4 White Linens	2.25	@	2.50
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	2.75
No. 4 White Cotton	1.90	@	2.15
Extra Light Prints	2.00	@	2.25
Ord. Light Prints	1.75	@	1.85
Med. Light Prints	1.55	@	1.65
Dutch Blue Cottons	1.75	@	1.85
French Blue Linens	2.30	@	2.40
German Blue Linens	2.15	@	2.25
German Blue Cottons	1.70	@	1.80
Checks and Blues	1.30	@	1.40
Linsey Garments	1.40	@	1.60
Dark Cottons	1.10	@	1.25
Old Shopperies	1.00	@	1.10
New Shopperies	.90	@	1.00
French Blues	1.70	@	1.80

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.50	@	1.60
Domestic	1.40	@	1.50
Wool Tares, light	1.20	@	1.30
Wool Tares, heavy	1.25	@	1.35
Bright Bagging	1.20	@	1.30
Manila Rope—			
Foreign	2.40	@	2.50
Domestic	2.50	@	2.75
Small Mixed Rope	1.10	@	1.35
New Burlap Cut	2.00	@	2.25
Hessian Jute Threads—			
Foreign	2.60	@	2.75
Domestic	2.80	@	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.70	@	2.80
Ordinary Hard White No. 1	2.35	@	2.45
Hard White No. 2	2.10	@	2.20
Soft White No. 1	1.90	@	2.00
Flat Stock—			
Stitchless	.85	@	.95
Over issue Mag.	.85	@	.95
Solid Flat Book	.70	@	.85
Crumpled No. 1	.65	@	.75
Solid Book Ledger	1.50	@	1.65
Ledger Stock	1.05	@	1.15
New B. B. Chips	.30	@	.35
Manilas—			
New Env. Cut	1.70	@	1.80
New Cuttings	1.35	@	1.45
Print	Nominal		
Bogus Wrapper	.40	@	.50
Container	Nominal		
Old Kraft Machine—			
Compressed bales	1.10	@	1.20
News—			
No. 1 White News	1.10	@	1.20
Strictly Overissue	.70	@	1.25
Strictly Folded	.40	@	.50
No. 1 Mixed Paper,	.25	@	.30

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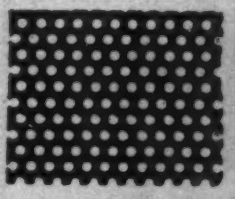

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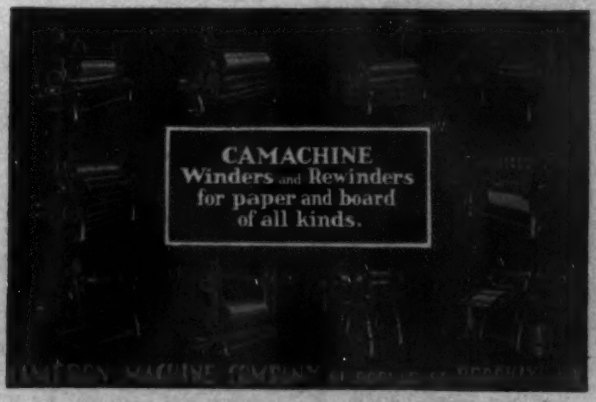


Twines
(F. o. b. Mill)

Cotton—			
B. C. 18 basis	.20	@	.22
No. 1	.20	@	.22
No. 2	.19	@	.20
No. 3	.17	@	.18
A. Italian, 18 basis	.36	@	.37
Flaxseed Jute—			
Dark, 18 basis	.18	@	.20
Light, 18 basis	.20	@	.22
Jute Wrapping, 3-6 Ply—			
No. 1	.15½	@	.16½
No. 2	.15	@	.16
Tube Rope—			
4-ply and larger	.09½	@	.09½
Fine Tube Rope—			
4-ply	.11¼	@	.11½
3-ply	.14¼	@	.14½
2-ply	.14¼	@	.14½
Paper Makers Twine	.08¼	@	.13½
Box Twine, 2-3 ply	.14¼	@	.14½
White Hemp	.13¼	@	.16½
Java Sisal—			
No. 1 Basis	.11½	@	—
No. 2 Basis	.10½	@	—
New Zealand Sisal	.11½	@	—
Sisal Lath Yarn—			
No. 1	.13½	@	.15½
No. 2	.11½	@	.13½
Manila Twine	.24½	@	.29½

CHICAGO

Paper
(F. o. b. Mill)

Rag Bond	.12	@	.50
Water Marked Sulphite Bond	.06½	@	.15
Sulphite Bond	.05½	@	.15
Superfine Writing	.18	@	.40
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S. & S. C. Book	.06¼	@	.07¼
No. 2 S. & S. C. Book	.05¼	@	.06¼
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04½	@	.05¼
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04½	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.88	@	4.25
No. 2 Kraft	3.88	@	4.25
Wood Tag Boards	.04¼	@	.05¼
Sulphite Screenings	.03	@	.04½
Manila Tissue	.05¾	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—			
Rolls, contract	41.00	@	—
Sheets, open	46.00	@	51.00
Boards, per ton—			
Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent coated	65.00	@	—
Container Lined—			
85 Test, per 1000 sq. ft.			1.70
100 Test, per 1000 sq. ft.			1.85

Old Papers
(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope cuttings	1.70	@	2.00
No. 1 Hard White	1.40	@	1.65
No. 1 Soft White	1.25	@	1.50
Ledger & Writings	.70	@	.80
Solid Books	.60	@	.70
Blanks	1.00	@	1.05
Kraffs	.80	@	.90
New Kraft Cuts	1.30	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	.90	@	1.00
Print Manila	.50	@	.55
Overissue News	.60	@	.70
Old Newspapers—			
No. 1	.50	@	.55
Mixed Papers—			
No. 1	.30	@	.35
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper
(F. o. b. Mill)

Bonds	.04	@	.40
Ledgers	.06	@	.40
Writings—			
Superfine	.10	@	.18
Extra Fine	.15	@	.24
Fine	.15	@	.36
Fine, No. 2	.10	@	.25
Fine No. 3	.05½	@	.18
Book, M. F.	.04¾	@	.07
Book, S. S. & C.	.05	@	.07¾
Book, Coated	.06	@	.16
Coated Lithograph	.06	@	.11
Label	.07	@	.11
No. 1 Jute Manila	.06	@	.10
Manila Sul., No. 1	.03	@	.06
Manila No. 2	.03	@	.05
No. 1 Kraft	.05¼	@	.06½
No. 2 Kraft	.03¾	@	.05
Southern Kraft	2.75	@	4.00
Common Bogus	.03	@	.04½
(Delivered Philadelphia)			
News Print Rolls	46.00	@	55.00
Straw Board	40.00	@	45.00
News Board	50.00	@	—
Chip Board	45.00	@	—
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	32.25	@	54.25
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)
(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.03½	@	.04
New White, No. 2	.02½	@	.04
Light Silesias	.02½	@	.02
Silesias, No. 1	.03	@	.03½
Black Silesias, soft	.02½	@	.03
New Unbleached	.05	@	.03½
Washable, No. 1	.01½	@	.02
Blue Overall	.03½	@	.04
Cottons—According to grades—			
Washable, No. 2	.02½	@	.03
New Blue	.01½	@	.03
Fancy	.01½	@	.03
New Black Soft	.02	@	.04
New Light Seconds	.01½	@	.02
New Dark Seconds	1.50	@	1.75
Khaki Cuttings—			
No. 1 O.D.	.03	@	.04
No. 2 Mixed	.03	@	.04
Corduroy	.02	@	.03
New Canvas	.03½	@	.04½
New Black Mixed	.02½	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	2.50	@	3.50
Miscellaneous	1.75	@	2.25
M. G.	3.00	@	3.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.50
Repacked	1.50	@	2.00
Black Stockings (Export)	2.00	@	3.50
Roofing Stock—			
Foreign No. 1	.50	@	.75
Repacked	.70	@	.85

Bagging
(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.25	@	1.50
Domestic	1.50	@	1.75
Manila Rope	2.00	@	2.25
Sisal Rope	1.25	@	1.50
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	1.25	@	1.50
No. 2	.80	@	1.00
Wool Tares, heavy	2.75	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.25	@	2.50
New Burlap Cuttings	2.00	@	2.25

Old Papers
(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	2.00	@	2.10
No. 1 Soft White	2.05	@	2.10
No. 2 Soft White	1.50	@	1.60
No. 1 Mixed	.95	@	1.00
No. 2 Mixed	.75	@	.80
Solid Ledger Stock	1.50	@	1.60
Writing Paper	1.25	@	1.50
No. 1 Books, heavy	.90	@	1.00
No. 2 Books, light	.70	@	.80
No. 1 New Manila	1.20	@	1.30
No. 1 Old Manila	.85	@	.90
Print Manila	.75	@	.80
Container Manila	.65	@	.70
Old Kraft	1.00	@	1.10
Common Paper	.35	@	.40
No. 1 Mixed Paper	.40	@	.45
Straw Board Chip	.40	@	.45
Binders Board Chip	.40	@	.45
Corrugated Board	.60	@	.70
Overissue News	.60	@	.65
Old Newspapers	.40	@	.50

BOSTON

Paper
(F. o. b. Mill)

Ledgers—			
Sulphite	.06	@	.12½
Rag Content	.12	@	.30
All Rag	.36	@	.52½
Bonds—			
Sulphite	.05½	@	.11
Rag Content	.12	@	.30
All Rag	.36	@	.45
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06¾
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04½	@	.05
No. 2 Kraft	.03½	@	.04¾
(F. o. b. Boston)			
Southern Kraft	.03¾	@	.04¾
(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)			
Common Bogus	.02	@	.02¾
(Delivered New England points)			
News Print, rolls	44.50	@	—
Straw Board, rolls	.009	—	@35.00
Straw Board in Sheets, basis 35s to 70s	—	@40.00	
Filled News Board	45.00	@50.00	
Chip Board	42.50	@47.00	
Chip Board (Creasing)	45.00	@	—
Single Manila Lined Chip	52.50	@62.50	
Single White, Patent Coated News Board—Bender	62.50	@72.50	
Wood Pulp Board	70.00	@75.00	
Binder Boards	62.00	@75.00	

Old Papers
(F. o. b. Boston)

Shavings—			
No. 1 Hard White	$2.20	@	2.35
No. 1 Soft White	1.75	@	2.00
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.75	@	—
Overissue Ledger Stock	1.15	@	1.20
Mixed Ledgers	.95	@	1.05
No. 1 Books, heavy	.85	@	.95
No. 1 Books, light	.65	@	.75
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.25	@	1.30
No. 1 Old Manila	.75	@	.80
White Blank News	1.05	@	1.10
No. 1 Kraft	1.10	@	1.15
Manila	.70	@	.75
No. 1 Mixed Papers	.20	@	.25
Print Manila	.40	@	.45
Overissue News	.45	@	.50
Old Newspapers	.35	@	.40
Box Board Chips	.32½	@	.35
Corrugated Boxes	.35	@	.40
Screening Wrappers	.60	@	.70

Bagging
(F. o. b. Boston)

Manila Rope—			
Foreign	—	@	2.25
Domestic	—	@	2.50
Transmission Rope	1.60	@	—
Mixed Strings	—	@	.60
Jute Rope	1.35	@	—
Scrap Burlaps	.65	@	.70
Gunny No. 1—			
Foreign	1.40	@	1.45
Domestic	1.20	@	1.25
Bleachery Burlap	3.00	@	3.25
Scrap Burlap	1.15	@	—
Scrap Sisal	1.10	@	1.20
Scrap Sisal for shredding	1.25	@	1.35
Wool Tares, heavy	—	@	1.25
New Burlap Cuttings	1.35	@	1.60
Australian Wool Pouches	2.25	@	2.50
Heavy Baling Bagging	1.40	@	1.50
Paper Mill Bagging	.90	@	1.10
Bagging No. 2	.50	@	.55

Domestic Rags (New)
(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.02	@	.02½
New White No. 1	.06½	@	—
New White No. 2	.04½	@	.05
Silesias No. 1	.04	@	—
New Black Silesias	.02½	@	.03
New Unbleached	.07	@	.07¼
Blue Cheviot	—	@	4.65
Fancy	—	@	.02½
Washable	.02¾	@	—
Cottons—According to grades—			
Blue Overalls	—	@	.03¾
New Black, soft	.04	@	.04½
Khaki Cuttings	.03	@	.03½
O. D. Khaki	.03	@	.03¼
Corduroy	.01¾	@	.02
New Canvas	—	@	.05
B.V.D. Cuttings	—	@	.06¼

Domestic Rags (Old)
(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.00	@	2.25
White No. 2—			
Repacked	2.00	@	2.25
Miscellaneous	2.00	@	2.75
Twos and Blues	1.25	@	1.50
Thirds and Blues			
Repacked	1.10	@	1.25
Miscellaneous	.85	@	.90
Black Stockings	2.25	@	2.50
Roofing Stock			
No. 1	.85	@	.90
No. 2	.70	@	.75
No. 3	.60	@	.65

Foreign Rags
(F. o. b. Boston)

Dark Cottons	1.00	@	1.10
New White Shirt Cuttings	5.50	@	6.00
Dutch Blues	2.00	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	1.55	@	1.60
Old Linsey Garments	1.25	@	1.35

TORONTO

Paper
(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.10¾	@	—
No. 2 Sulphite	.08½	@	—
No. 1 Colored	.10¾	@	—
No. 2 Colored	.09	@	.10
Ledgers (sulphite)			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F. (Carloads)	6.30	@	—
No. 3 M. F. (Carloads)	5.70	@	—
No. 4 M. F. (carloads)	4.75	@	—
No. 1 S. C. (carloads)	6.65	@	—
No. 3 S. C. (carloads)	6.20	@	—
No. 4 S. C. (carloads)	5.20	@	—
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	14.00	@	—
Wrapping—			
Rag Brown	4.25	@	—
White Wrap	2.22½	@	—
"B" Manila	4.75	@	—
No. 1 Manila	5.25	@	—
Fiber	5.25	@	—
Kraft, M. F.	5.75	@	—
Kraft No. 2	5.25	@	—

(F.O.B. Cars Toronto)

News, per ton—			
Rolls (contract)	45.50	@	—
Sheets	50.50	@	—

Pulp
(F. o. b. Mill)

Ground Wood	18.00	@	20.00
Sulphite easy bleaching	40.00	@	—
Sulphite, news grade	38.00	@	—
Sulphite, bleached	50.00	@	55.00
Sulphate	50.00	@	—

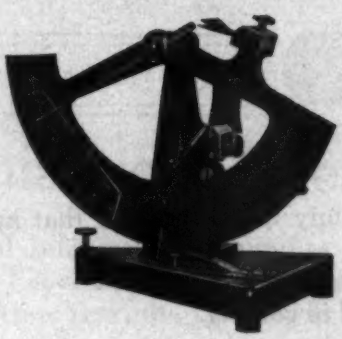
Old Waste Paper
(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.30
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	@	1.00
Light and Crumpled Book Stock	.80	@	.90
Ledgers and Writings	1.00	@	1.05
Manilas—			
New Manila Cut	1.25	@	1.30
Printed Manilas	.70	@	.60
Kraft	1.25	@	1.30
News and Scrap—			
Strictly Overissue	.80	@	—
Strictly Folded	.60	@	—
No. 1 Mixed Paper	.50	@	—

Domestic Rags
(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06	@	.06½
Fancy Shirt Cuttings	.02¼	@	.02½

The Elmendorf Tester for Tearing Strength Tests



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The Elmendorf Tester is the "Scientific Tool" to make the Elmendorf Tests. With this sensitive instrument tearing strength tests are made in machine direction and across machine direction. A true analysis of strength of materials is made with this test.

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